

A taxonomic revision of *Convolvulus* L. (Convolvulaceae) in Australia

R.W. Johnson

Summary

Johnson, R.W. A taxonomic revision of *Convolvulus* L. (Convolvulaceae) in Australia. *Austrobaileya* 6 (1): 1–39. A revision of the genus *Convolvulus* L. in Australia is presented. Twelve species are recognised and described, including four that are new. They are *C. graminetinus*, *C. recurvatus*, *C. tedmoorei* and *C. wimmerensis*. In two species, *C. angustissimus* and *C. recurvatus*, subspecies have been recognised and described. *C. angustissimus* subsp. *omnigracilis* and *C. angustissimus* subsp. *peninsularum*, and *C. recurvatus* subsp. *nullarborensis* are described as new while *C. angustissimus* subsp. *fililobus* is a new combination based on *C. erubescens* var. *fililobus* Wawra. A key to identify all species and subspecies is provided together with distribution maps and illustrations of certain diagnostic characters.

Keywords: Convolvulaceae, *Convolvulus*, Australia

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Introduction

The genus *Convolvulus* was formally established by Linnaeus (1753) and he recognised 31 species. From these species, the name *Convolvulus arvensis* was selected as the type of the genus by Hitchcock (1929). In *Genera Plantarum*, Linnaeus (1754) attributed the name to Tournefort. Linnaeus adopted a broad concept of the genus including in it species which are now segregated into other genera including *Calystegia* R. Br. (*Convolvulus sepium*), *Ipomoea* L. (*C. batatas*), *Operculina* Silva Manso (*C. turpethum*), *Merremia* Dennst ex Endl. (*C. umbellatus*), *Evolvulus* L. (*C. alsinoides*) and *Xenostegia* D. F. Austin & Staples (*C. tridentatus*).

The first published record of *Convolvulus* from Australia was by Sims (1808) when he described *Convolvulus erubescens* from a specimen collected by Mr Loddiges from New South Wales. Brown (1810) described three new species from Australia, namely *C. angustissimus*, *C. remotus* and *C. multicaulis*. The latter species is now placed in the genus *Jacquemontia* Choisy. Later Choisy (1824)

described *C. acaulis* from Kangaroo Island while still later Lehmann (1826) described *C. geniculatus* though no type was designated. Subsequently this species was listed as occurring in Australia. Vriese (1845) described four new species from Western Australia, namely *C. adscendens*, *C. huegelii*, *C. preissii* and *C. subpinnatifidus*. Mueller (1853) recognised *C. crispifolius*, based on a specimen he collected from Cudnaka in South Australia. However, in 1864, he concluded that the extreme variation exhibited by *C. erubescens* embraced all previously described species from Australia including *C. crispifolius* (Mueller 1864). Bentham (1869) agreed with this taxonomy and decided in his *Flora* treatment to recognise only one species, *C. erubescens*, to include the segregate species that had already been described. He also included in *Convolvulus* the genera *Jacquemontia* and *Calystegia*. Yet soon after, Bentham & Hooker (1873) recognised these three genera as being distinct. Domin (1928) described *C. clementii* from northern Western Australia as a new species occurring across tropical Australia.

Until the late 1980's, only two species of *Convolvulus* were recognised in local and

regional floras, *C. arvensis*, an early introduction from Europe, and the highly variable *C. erubescens* embracing all previously described native species. Since then I have described two species, *C. eyreanus* and *C. microsepalus* from South Australia as new (Johnson 1987).

According to Mabberley (1997) and Austin (1998), *Convolvulus* is a genus of about 100 species mainly of temperate origin, though Sa'ad (1967) recognised 118 species from the Mediterranean and Middle East alone while Austin (1982a), Ooststroom (1953) and Mabberley (1989) indicated there may be about 250 species in the genus. It is more likely it comprises about 150 species. *Convolvulus* is included in tribe Convolvuleae which also includes *Jacquemontia* and *Calystegia*.

Classification

Ooststroom (1953) recognised three tribes within the Convolvulaceae. One of these tribes, Cuscutae, represented by the genus *Cuscuta* L. is regarded as a separate family, Cuscutaceae, by some authors. The separation of the other tribes, the Convolvuleae and the Ipomoeae, is based on whether their pollen is spinulose (Ipomoeae) or smooth (Convolvuleae). Ooststroom (l.c.) placed *Convolvulus* in subtribe Convolvulinae with *Calystegia*, *Jacquemontia*, *Merremia*, *Operculina* and *Aniseia* Choisy. Austin (1973, 1975) recognised 9 tribes within Convolvulaceae, two of which were equivalent to subtribe Convolvulinae of Ooststroom. His Convolvuleae included *Convolvulus*, *Calystegia*, *Polymeria*, *Jacquemontia* as well as *Evolvulus* (Dicranostylinae) while his Merremieae (Austin 1982) included *Aniseia*, *Operculina* and *Merremia*. This division was based on cytological data, corolla shape and stylar characters. However, more recent studies (Austin 1998) using cladistic analyses suggest the Merremieae may not form a clade distinct from the Convolvuleae.

Three sections are recognised within *Convolvulus* (Sa'ad 1967), separated on the presence or absence of spines and whether or not the stems are twining. All of the Australian species belong to *C. sect. Convolvulus*, being espinose and twining.

Relationships

According to Austin (1973), *Convolvulus* is most closely related to *Calystegia*, *Evolvulus*, *Polymeria* and *Jacquemontia*. In Australia, *Jacquemontia* is clearly distinguished in possessing triramous hairs while *Evolvulus* has biramous hairs. The remaining genera have simple hairs. The style in *Polymeria* bears a much divided stigma with usually 4–8 lobes unlike that in *Convolvulus* which has two lobes. *P. distigma*, however, has a 2-lobed stigma though the branches are similar in structure to the other species of *Polymeria* and usually have short lobes at the base. *Calystegia* is distinguished by its large bracts which enclose or closely subtend the calyx. *Convolvulus* and *Polymeria* can also be distinguished from the other genera in possessing tri-colpate rather than either pantoporate or pantocolpate pollen grains.

Materials and Methods

This revision is based principally on herbarium specimens held at AD, BRI, CANB, HO, MEL, NE, NSW and PERTH. Only limited field work in Queensland and the Northern Territory was possible. In addition, plants were grown from seed in a glasshouse at BRI. Specimens were sorted into nominal taxa and, from each, specimens with flowers and fruit were selected for comprehensive dissections. Those specimens which could not be placed within nominal taxa were also dissected. Attributes from dissected specimens were then classified using a variety of numerical taxonomic programs. While the classifications produced as a result were not completely satisfactory, groupings that were produced formed part of the input into the taxonomic treatment presented below.

Attributes

Attributes of Australian species of *Convolvulus* which are significant diagnostically are discussed below.

Cotyledons: The cotyledons fall into one of two morphological groups i.e. those that are:

- bilobed, with the lobes, linear, diverging and greatly exceeding the base e.g. *C. clementii* (Fig. 1A), or

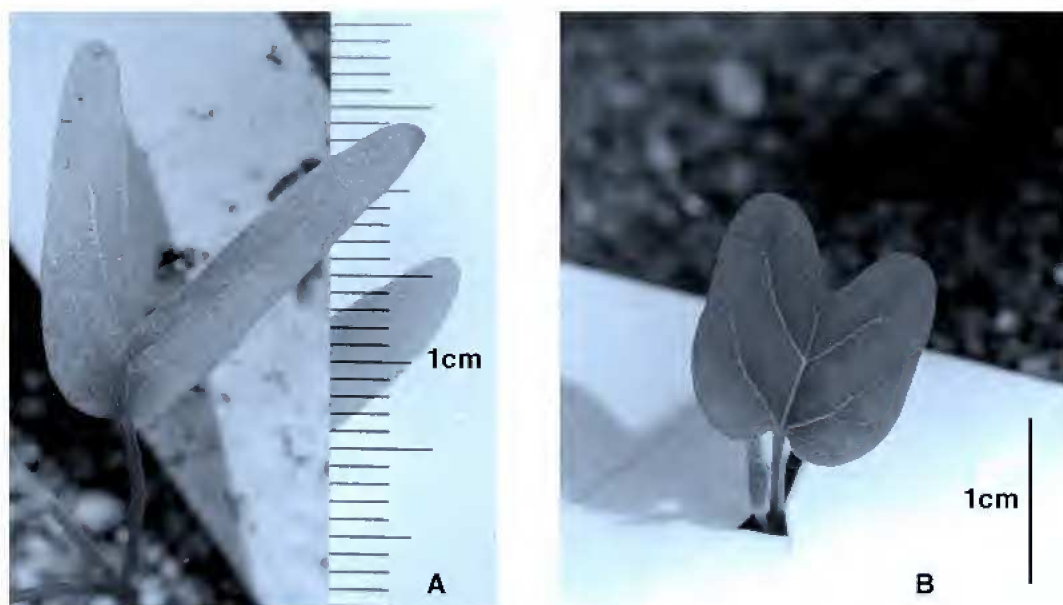


Fig. 1. Cotyledons of *Convolvulus* species. A. *C. clementii* from S.A. Pastoral Board s.n. (AD98010365); B. *C. remotus* from Kenneally 4643 (PERTH).

- oblong to rounded oblong, with two short rounded apical lobes, always shorter than the base e.g. *C. angustissimus*, *C. arvensis*, *C. crispifolius*, *C. eyreanus*, *C. graminetinus*, *C. microsepalus*, *C. recurvatus* and *C. remotus* (Fig. 1B).

Habit: Most species have long trailing and twining stems. The initial leaves are somewhat similar in shape in all the Australian species, being oblong to linear, often hastate, and with entire to undulate margins. However, the cauline leaves can vary greatly both between and within species. In some species such as *C. remotus*, *C. microsepalus* and *C. arvensis*, leaf shape is similar from base to the tips of the stems. In other species such as *C. angustissimus* and *C. clementii*, considerable variation occurs within a single plant. Lower cauline leaves are often greatly different in both shape and size from leaves found on fertile branches. In some taxa this difference may have taxonomic significance. This is particularly so within *C. angustissimus*. Because of considerable variation within individuals and within populations, identification can be difficult from single specimens taken from one part of a plant. This problem is compounded by seasonal conditions. Specimens taken from the same population can vary greatly when collected in the spring and late summer, while plants which

are rapidly forced into early flowering and fruiting can produce inflorescences from the axils of basal and lower cauline leaves.

Vestiture: Hairs are simple and tubercle-based. They vary considerably in length and orientation but there is some consistency in the vestiture in individual species. Both *C. remotus* and *C. microsepalus* have characteristically short (< 0.4 mm long), appressed hairs. By contrast the hairs on *C. clementii* and *C. angustissimus* subsp. *angustissimus* when present are commonly irregularly spreading and often exceed 0.5 mm, and may even approach 1 mm in length. Both *C. eyreanus* and *C. crispifolius* have dense silky semi-appressed hairs. In many species, the vestiture changes from that on basal leaves to that on fertile stems with hairs more likely to be spreading in basal parts and tightly appressed on terminal shoots. Terms such as sparsely hairy, moderately hairy and densely hairy are used in the text. Moderately hairy is used when the length of the hairs begins to exceed their distance apart while densely hairy is used where the density is such that the vestiture obscures the leaf surface.

Inflorescence: All species have a simple or compound dichasial inflorescence which is axillary. Normally only one inflorescence is found in a leaf axil but in many species such as

C. clementii, *C. graminetinus*, *C. remotus*, *C. arvensis*, *C. tedmoorei*, *C. recurvatus* and *C. erubescens*, occasionally two occur. Some species, such as *C. angustissimus* and *C. microsepalus*, almost always have a simple inflorescence. In other species, such as *C. clementii*, *C. erubescens* and *C. arvensis*, it is common to find compound inflorescences on most specimens. While bracteoles are paired on all branches, it is only the outer one that subtends a bud or flower. In the text, such inflorescences are referred to as one-sided dichasia. The bracteoles are usually opposite in species with solitary flowers but in those with one-sided dichasia they are often sub-opposite to alternate, even when a single flower is present.

Another distinguishing character is the shape of the pedicel at fruiting. In some species, such as *C. angustissimus*, *C. wimmerensis* and *C. recurvatus*, the pedicel becomes strongly recurved at fruiting while in other species, such as *C. erubescens* and *C. clementii*, the fruiting pedicel is straight or occasionally is sinuate or rarely slightly curved. Aside from *C. graminetinus*, a straight pedicel at fruiting appears to be characteristic of northern species with species restricted to southern areas all possessing strongly recurved pedicels.

Calyx: The calyx consists of 5 free sepals, quincuncially arranged. The outer two sepals are similar or slightly unequal in size but they are usually somewhat different in shape and / or size from the inner pair. The intermediate sepal is a hybrid in shape, the exposed half resembling that of the outer sepals, the enclosed half resembling the inner. The shape of the outer sepals, in particular the apex, is diagnostic. Both *C. arvensis* and *C. microsepalus* have small outer sepals with a rounded, emarginate apex. By contrast all other species have an acute to rounded apex with a \pm prominent recurved apiculum.

Corolla: The corolla is typically funnel-shaped with a narrow tube which flares distally into a broad limb. The point at which it flares is marked by five V-shaped structures where the midpetaline bands diverge. The length of the tube to the point where the corolla flares has use as a possible discriminating attribute. The

length of the corolla and the diameter of the limb are difficult to ascertain on herbarium specimens because the corolla is funnel-shaped and is flattened during pressing. The length of the flattened and dried corolla approaches the petal length and it is for this reason, petal length has been used in the key to species and in species descriptions.

Each petal has a distinct mid-petaline band, hairy on the outside in the upper part and which tapers towards the apex. The tube is always glabrous on the outside. The colour of the corolla varies from white to pale pink, or occasionally purplish. As in other species of Convolvulaceae, white-flowered forms have been recognised e.g. *Convolvulus erubescens* var. *albus*, but such formal recognition appears trivial.

Stamens: The five stamens are affixed to the corolla tube at the base and alternate with the lobes. The lower part of the filament, attached to the corolla tube, is flared downwards and usually bears low tubercles on the margin. The tubercles extend beyond the point of attachment onto the inner face of the free upper part of the filaments. The filaments are usually unequal in length. The pollen grains are spheroidal or ellipsoidal and 3-colpate. The colpi are linear in shape and the surface of the pollen grains is smooth (Fig. 2).

Ovary: In all species the ovary is borne on a cup-shaped disk. The ovary is 2-celled with 2 basal ovules in each cell and is tipped by a style with two \pm cylindrical stigmas. The nature of the stigmas is a generic character.

Capsule: All species have globular to globular-ovoid capsules with a distinct beak resulting from the persistent style base. The capsules dehisce loculicidally into 2 valves with each valve often splitting further into 2 parts. The capsule also dehisces at the base leaving a persistent dissepiment. The size of the capsule varies depending on maturity and seasonal conditions but can be used to discriminate among species.

Seeds: Under normal circumstances four seeds are produced in each capsule, two in each cell. The seeds are therefore $\frac{1}{4}$ -globular or globular-

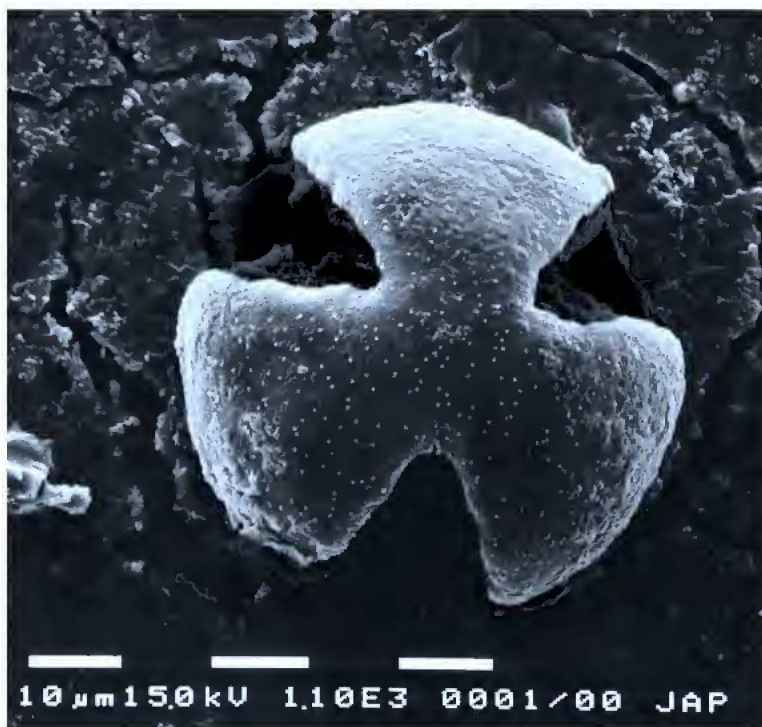


Fig. 2. Pollen grain of *Convolvulus remotus* from Kraehenbuehl 2782 (AD).

ovoid in shape, with two flat faces and the abaxial face concave. On occasions, fewer seeds are produced and in these circumstances the seed shape diverges from the usual pattern. The size and surface sculpture are diagnostic. Seeds of all species are illustrated in the text. The underlying surface is finely and regularly punctate but is usually covered with low tubercles or ridges of irregular shape. A wing, continuous or discontinuous, may or may not occur. The characteristic patterning on the seed surface appears to be produced towards maturity and immature seed may lack any raised surface structures. However, mature seed of *C. angustissimus* subsp. *fililobus* appears to have a smooth finely punctate surface without surface structures. Though no species has hairy seeds, the tubercles on the surface and wings on the outer margins in some species, in particular in *C. clementii*, appear to be formed by the fusion of hair-like structures.

Hybridisation: While no study was made of gene interchange among species, genetic traits such as recurved pedicels and the one-sided dichasial inflorescence do appear to flow into populations of species which normally lack

them. In areas of geographical overlap where both *C. angustissimus* subsp. *angustissimus* and *C. erubescens* are found, strongly recurved pedicels are occasionally found in populations of *C. erubescens*.

Biogeography: The genus is primarily temperate in distribution. The greatest diversity of species in Australia is found in the south-east with 8 species being recorded in Victoria, 8 in South Australia and 10 in New South Wales. By contrast only 2 species are known from the Northern Territory, 5 from Western Australia and 7 from Queensland. *Convolvulus* is one of a few genera, including *Calystegia* and *Wilsonia* R.Br., in Convolvulaceae which are concentrated in temperate regions of Australia. Most genera and species of this family occurring in Australia are tropical and sub-tropical in distribution.

Within *Convolvulus*, three species are common and widespread with *C. angustissimus* occupying moister mainly southern areas of Australia, *C. clementii* occupying arid and semi-arid regions of all mainland states and *C. remotus* more common in southern wetter areas but extending into more arid areas, often

on moister sites. The remaining species, aside from *C. graminetinus* which is found in grasslands and grassy forests and woodlands on mainly clay soils in semi-arid and sub-humid Queensland and New South Wales, have relatively restricted distributions.

Taxonomy

Convolvulus L., Sp.Pl. 1:153 (1753). **Type:** *Convolvulus arvensis* L. (lecto: *fide* Hitchcock 1929).

Annual or perennial herbs with erect, trailing or twining stems, or in some extra-Australian species shrubs or sub-shrubs, sometimes spiny; stems hairy, more rarely \pm glabrous; hairs simple. Leaves simple, alternate, petiolate or sub-sessile; blade very variable in shape, entire to deeply divided, often hastate or sagittate, with base usually cordate. Flowers axillary in 1- to few-flowered dichasia or in sub-umbellate heads in some extra-Australian species. Sepals 5, free, with inner and outer pairs subequal and the intermediate one asymmetric. Corolla funnel-shaped or more rarely campanulate, white, pink or mauve with 5 midpetaline bands

usually hairy outside towards the apex, otherwise glabrous; limb sub-entire to shallowly 5-lobed. Stamens 5, included; filaments epipetalous, alternating with the petals, terete above, flattened and dilated downwards, often with low tubercles towards the base; anthers bilocular, dehiscing longitudinally; pollen spheroid or ellipsoid, smooth. Ovary on a cup-shaped disk, bilocular, each locule with 2 ovules; style simple, filiform; stigmas 2, cylindrical, obtuse. Capsule globular or globular-ovoid, with a persistent style base, 2–4-valved, irregularly circumscissile at the base but with a persistent dissepiment. Seeds 4 or less by abortion, $\frac{1}{4}$ -globular or $\frac{1}{4}$ -globular-ovoid, with a finely punctate surface usually bearing irregular tubercles or ridges.

Distribution: A genus of c. 150 species found throughout the temperate and subtropical regions of both hemispheres, rarely extending into the tropics.

Etymology: The generic name refers to the twining habit of most species being based on the latin *convolvere*, to roll together or entwine.

Key to native and naturalised (*) species of *Convolvulus* in Australia

Because of the extreme variability in leaf shape from base to tip of the stem in some species, the leaf shape used in the key refers to mid-cauline leaves, particularly those subtending inflorescences.

1. Leaves hastate or sagittate, with an entire, oblong or triangular-oblong, occasionally linear, terminal lobe usually > 2 mm wide, and a pair of entire or occasionally 2-toothed or 2-lobed basal lobes, ascending lobes absent, rarely a tooth or a short lobe present on a few leaves at the junction of the terminal and basal lobes 2
- Leaves crenate, serrate to shallowly lobed or if a distinct terminal lobe is present then basal lobes auriculate and toothed or much divided with ascending lobes prominent 6
2. Sepals 4 mm or less in length, with a rounded to truncate, emarginate apex, glabrous to sparsely hairy 3
- Sepals 4–7 mm long, rarely shorter, with apex acute to rounded, apiculate 4
3. Petals 15–30 mm long; sepals 3–4 mm long; leaves glabrous or with a few weakly erect hairs 1. **C. arvensis*
- Petals 5–10 mm long; sepals usually < 3 mm long; leaves moderately to sparsely hairy with appressed hairs 2. *C. microsepalus*

4. Sepals and leaves with short appressed or crisped-appressed hairs, or if hairs spreading then seeds with a fine pattern of low irregular tubercles; inflorescence a 1-sided dichasium with 1–3 flowers; pedicels at fruiting straight or sinuate, or if recurved, then petals 7–10 mm long 5
- Sepals and leaves with spreading hairs and seeds with sparse low reticulate ridges; inflorescence of solitary flowers; pedicel at fruiting recurved; petals 8–25 mm long **9. *C. angustissimus***
5. Pedicels at fruiting recurved; capsule globular to 5.5 mm long; seeds ¼-globular in shape, to 3.5 mm in length, faces with a fine pattern of low irregular tubercles; petals to 10 mm long; sepals usually ± glabrous to sparsely hairy **3. *C. graminetinus***
- Pedicels at fruiting straight or sinuate; capsule globular to globular-ovoid, 5.5–8.5 mm long; seeds ¼-ellipsoid in shape, 3–4.8 mm long, faces with irregular ridges; petals exceeding 10mm in length; sepals moderately to densely hairy **4. *C. remotus***
6. Leaves crenate or serrate with basal lobes usually not prominent, sericeous; hairs ± appressed, commonly > 0.5 mm long 7
- Leaves with distinct terminal lobe and much divided basal lobes or basal lobes auriculate and toothed, not sericeous; hairs usually < 0.5 mm long 8
7. Peduncle at flowering < 12 mm long; seeds < 3 mm long; capsule < 4.5 mm in diameter **5. *C. crispifolius***
- Peduncle at flowering usually > 12 mm long; seeds > 3 mm long; capsule 5–6 mm in diameter **6. *C. eyreanus***
8. Corolla with petals > 9 mm long; seeds reticulate, tuberculate or smooth 9
- Corolla with petals < 9 mm long; seeds tuberculate 12
9. Pedicel at fruiting straight or sinuate; inflorescence a 1-sided dichasium with 1–3 flowers; peduncle slightly ribbed; margin of terminal lobe usually undulate to lobed; basal lobes auriculate, dentate; seeds with many laterally compressed sinuate tubercles **7. *C. erubescens***
- Pedicel at fruiting strongly recurved 10
10. Faces of seeds with a fine pattern of low irregular tubercles; inflorescence a 1-sided dichasium with 1 or 2 flowers; peduncle and stems often slightly ribbed; petals to 10 mm long **3. *C. graminetinus***
- Faces of seeds with sparse, low, reticulate ridges; flowers solitary; peduncle and stems terete; petals 9–25 mm long 11
11. Leaves densely hairy, silvery coloured, with mainly appressed hairs, with ascending lobes often at least half the length of the terminal lobe **8. *C. wimmerensis***
- Leaves moderately to sparsely hairy, or if densely hairy, then hairs ascending or spreading, with ascending lobes rarely half the length of the terminal lobe **9. *C. angustissimus***
12. Pedicel at fruiting recurved 13
- Pedicel at fruiting ± straight to sinuate 14
13. Sepals ± glabrous to sparsely hairy; pedicel at fruiting 3–12 mm long; seeds densely tuberculate, wingless **3. *C. graminetinus***
- Sepals moderately to densely hairy, pedicels at fruiting 3–6 mm long; seeds sparsely tuberculate, with a discontinuous wing of fused hair-like structures **10. *C. recurvatus***

14. Stems slender; seeds 2.5–3.2 mm long, with wing present, often discontinuous **11. *C. clementii***
 Stems coarse; seeds 3.5–4 mm long with no obvious wing **12. *C. tedmoorei***

1. *Convolvulus arvensis* L., Sp. Pl. 1: 153 (1753).

Type: Sweden, herb. Linn. 218.1 (lecto: LINN), *fide* Meeuse (1957), p. 695.

Perennial with trailing and twining stems arising from a well developed underground root system; stems terete, narrowly winged, glabrous or sparsely to very rarely moderately hairy, glabrescent, hairs crisped to sinuate and semi-erect, 0.2–0.5 mm long. Leaves petiolate, of similar shape from base to tip of the stem (Fig. 3A) though petiole becoming shorter and blade smaller towards the tip; petiole 5–25 mm long; blade ovate to oblong, often triangular-oblong, hastate or sagittate, 15–60 mm long, 5–40 mm wide, apex acute to rounded, sometimes emarginate, mucronulate, base truncate to cordate, basal lobes triangular, to 10 mm long, acute to rounded, entire or very rarely with a tooth on the lower margin, ascending lobes absent, terminal lobe oblong, 12–55 mm long, glabrous or with scattered hairs, hairs crisped and spreading to weakly erect, 0.2–0.5 mm long. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium, with 1–4 flowers or rarely with 2 inflorescences per axil; peduncle terete, with low ribs, 4–65 mm long, glabrous to sparsely hairy, rarely moderately hairy, hairs loosely crisped-appressed to weakly erect, 0.1–0.5 mm long; bracteoles opposite to subopposite, linear to narrowly obovate, 1.5–7 mm long, up to 2 mm wide, apex acute to obtuse, mucronulate, eciliate or with well developed cilia, sparsely hairy on the back with hairs mainly on the midrib; pedicel 6–22 mm long, recurved at fruiting, hairs as for peduncle. Outer sepals oblong, elliptic-oblong to obovate-oblong, 3–4.2 mm long, rarely shorter, 1.75–2.8 mm wide, apex rounded or retuse, glabrous or moderately ciliate and \pm glabrous or sparsely hairy outside, with occasional hairs along the midrib and near the tip; inner sepals orbicular to obovate-orbicular, 3–4.5 mm long, 3–4.5 mm wide, apex retuse, mucronulate, base rounded, \pm glabrous. Corolla funnel-shaped, white to pink, 15–25 mm long, 20–30 mm diameter, flared 4–7 mm above the base of the tube; petals 17–30 mm long, 13–18

mm wide, with rounded, emarginate to shortly bilobed lobes, glabrous except for scattered hairs on the outside of the midpetaline band for 4–8 mm, occasionally up to 15 mm, from the apex. Stamens 5, unequal; filaments affixed to the corolla tube for 2.5–3.5 mm from the base, free for 4.5–10 mm, with short cylindrical tubercles to 0.2 mm long, mainly on the margins, from 0.75–1.25 mm above the base of the corolla and extending for 4–7 mm; anthers oblong to oblong-elliptic, 2.5–3.2 mm long, 1–1.5 mm wide, apex truncate, emarginate, base sagittate, basal lobes 0.7–0.9 mm long. Ovary ovoid, 1.5–2.5 mm long, on a lobed disk 0.5–0.8 mm high, glabrous or hairy; style 8–9 mm long; stigmas cylindrical to narrowly obovate, occasionally falcate, obtuse, 2.5–4 mm long. Capsule globular to globular-ovoid, 4–7 mm long, 4–6 mm diameter, glabrous. Seeds 4, $\frac{1}{4}$ -globular-obovoid, 3–4 mm long, c. 3 mm wide, dark-brown to black, surface finely punctate bearing a fine and \pm regular pattern of small, often laterally compressed, tubercles, wingless (Fig. 4A).

Selected specimens (113 specimens examined):

Western Australia. Dwarda, Feb 1941, *O'Connell* s.n. (PERTH); Boyup Brook, Jan 1949, *O'Sullivan* s.n. (PERTH); South Coogee, Feb 1951, *Quinlivan* s.n. (PERTH); Fremantle, Mar 1946, *Royce* s.n. (PERTH); Bunbury, Dec 1952, *Simpson* s.n. (PERTH). **South Australia.** Yallanda Flat, Feb 1964, *Alcock* 654A (AD); Railway Terrace, Edwardstown, Nov 1987, *Dashorst* s.n. (BRI); Fulham, c. 8 km W of Adelaide, Nov 1967, *Smith* 984 (AD); Adelaide, Jan 1960, *Symon* 332 (NE). **Queensland.** LEICHHARDT DISTRICT: Trelinga, 2 miles W of Wandooan, Mar 1972, *Elphinstone* s.n. (BRI). PORT CURTIS DISTRICT: Marlborough, Property of G.J.A. Hack, Jun 1966, *Kelly* s.n. (BRI). BURNETT DISTRICT: Monto, Oct 1951, *Stubbs* s.n. (BRI). WIDE BAY DISTRICT: 2 miles SW of Kilkivan, Feb 1970, *Ditchmen* s.n. (BRI). MARANO DISTRICT: St George Irrigation, Jan 1969, *Hazard* s.n. (BRI). DARLING DOWNS DISTRICT: Cooper Gully road, NE of Yangan, Oct 1997, *Bean* 12426 (BRI). MORETON DISTRICT: 6 miles ESE of Gatton, Aug 1968, *Hazard* s.n. (BRI). **New South Wales.** Carrol near Gunnedah, Jan 1971, *Dale* s.n. (NSW); Henty, Feb 1949, *McBarron* 3078 (NSW); Campbelltown, Feb 1962, *McBarron* s.n. (NSW); Parkes, Mar 1925, *Swann* s.n. (NSW); Armidale, Nov 1982, *Wilson & Lapinuro* LL11 (NSW). **Victoria.** MIDLANDS: Avoca, 1894, *Martin* s.n. (MEL). **Tasmania.** Sandy Bay, Hobart, Nov 1941, *Curtis* s.n. (HO); New Town Research Laboratories,

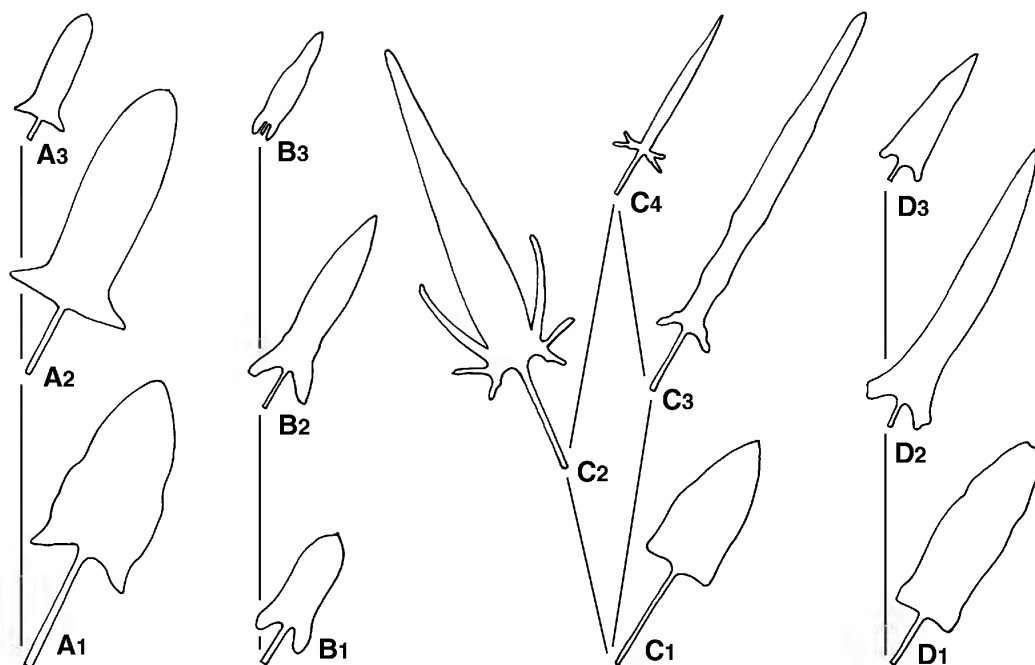


Fig. 3. Variation in leaf shape of *Convolvulus* species from base to tip of stems. A. *C. arvensis* $\times 1$. (1) *Failes* s.n. (NE25445a), (2,3) *Rodway* s.n. (HO 15261); B. *C. microsepalus*. (1) *Pfeiffer & Pfeiffer* s.n. (AD96919556) $\times 2$, (2,3) *Orchard* 211 (AD) $\times 1$; C. *C. graminetinus*. (1) *McDonald* 46 (BRI) $\times 0.5$, (2) *McDonald* 46 (BRI) $\times 1$, (3) *Fensham* 2803 (BRI) $\times 1$, (4) *Fensham* 1736 (BRI) $\times 1$; D. *C. remotus* (1-3) *Alcock* 653G (AD) $\times 1$. Del. W. Smith

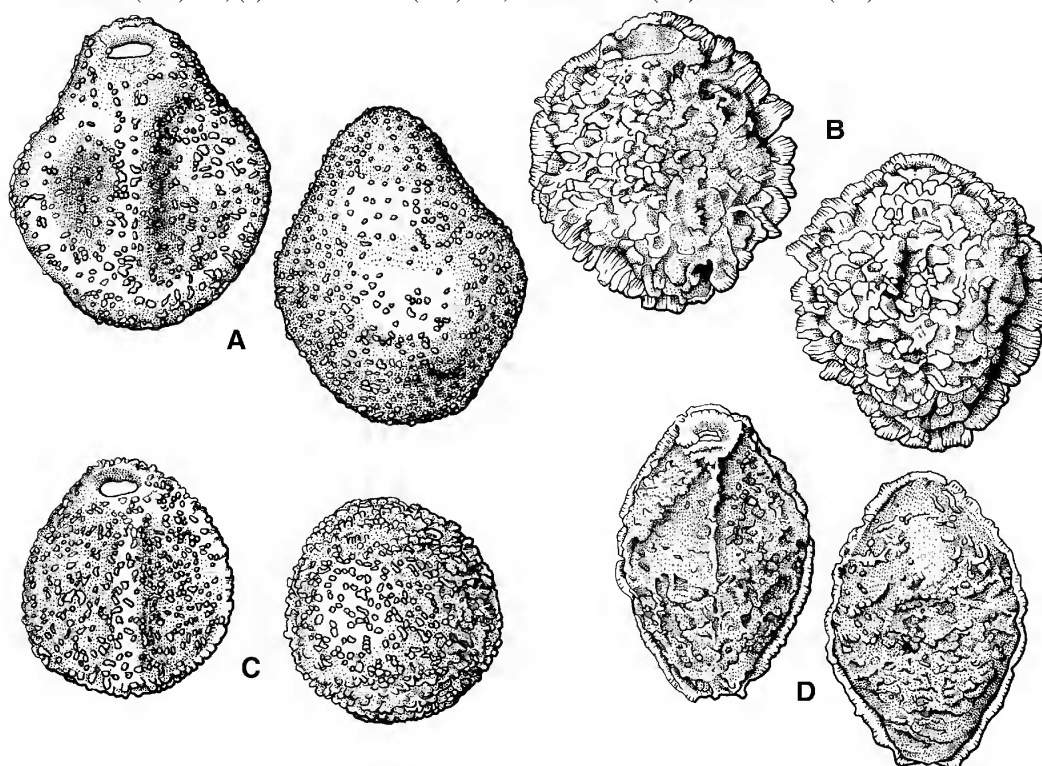
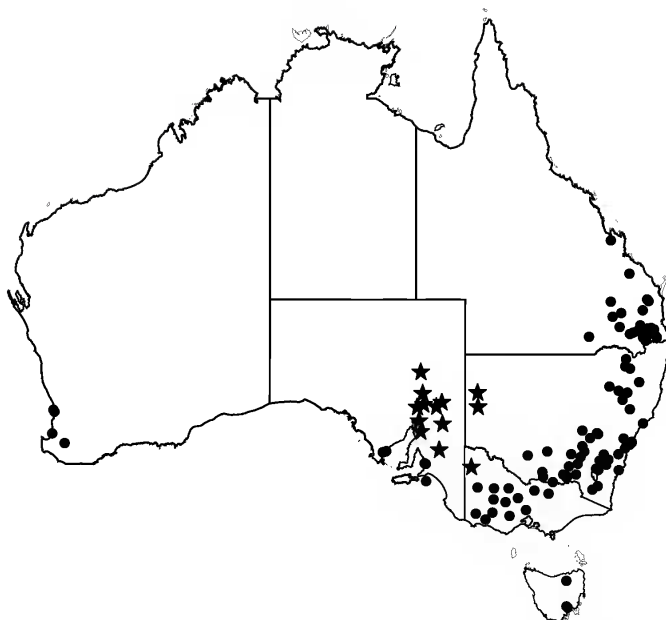


Fig. 4. Seeds of *Convolvulus* species, adaxial (L.H.S.) and abaxial (R.H.S.) surfaces $\times 10$. A. *C. arvensis* from *Curtis* s.n. (HO36313); B. *C. microsepalus* from *Copley* 192 (AD); C. *C. graminetinus* from *Fensham* 3332 (BRI); D. *C. remotus* from *Lothian* 1214 (AD). Del. W. Smith.



Map 1. Distribution of ●. *Convolvulus arvensis*. ★. *C. microsepalus*. Del. W. Smith.

Feb 1983, *Morris* 8338 (HO); Granton, Jan 1981, *Orchard* 5278 (HO); Royal Park, Hobart, Mar 1961, *Somerville* s.n. (HO); Hobart, Jan 1877, *Spicer* 118 (HO).

Distribution and habitat: *C. arvensis* is a native of Eurasia but is now widespread throughout the temperate regions of the world. In Australia, it is a weed of cultivation and roadsides, often on deep fertile clay soils. It has been recorded from most of the major cultivation regions of temperate Australia and northwards to the Darling Downs and central Queensland (Map 1).

Affinities: Though it is not a native of Australia, *C. arvensis* most closely resembles *C. microsepalus*. Both species have sepals which are small and similar in shape with a blunt, somewhat emarginate apex, very different from those in other Australian species and both have hastate leaves with entire margins. However, the latter has much smaller flowers.

Phenology: Flowering occurs mainly from mid spring to early autumn (October–March) with fruiting mainly in early to mid autumn (March–April).

Notes: The date of introduction of this species into Australia is unknown. Bentham (1869)

makes no reference to *C. arvensis* in Australia. Earliest herbarium records include *Woolfs* s.n. (MEL) collected in 1869 in New South Wales, *Wilson* 12 (MEL) in 1883 in Victoria and *Spicer* 118 (HO) in 1877 in Tasmania. Woolfs (1867) in his paper on accidental plant introductions does not mention *C. arvensis*.

Etymology: The specific epithet is from the Latin *arvensis* meaning ‘pertaining to fields or cultivated lands’ which refers to the habitat where the species is commonly found.

2. *Convolvulus microsepalus* R.W. Johnson, *Austrobaileya* 2:410 (1987). **Type:** South Australia, Flinders Ranges: c. 51 km N of Quorn on the Quorn to Hawker road, 8 November 1970, *A.E. Orchard* 2626 (holo: AD; iso NCU, COLO, n.v.).

Perennial with trailing and twining stems; stems slender, terete, moderately densely to sparsely hairy, glabrescent, hairs appressed, 0.15–0.4 mm long. Leaves similar in shape from base to tip of the stem (Fig. 3B). Basal leaves petiolate; petiole short, 2–7 mm long; blade oblong, slightly hastate, 10–20 mm long, 4–5 mm wide, apex obtuse to bluntly acute, mucronulate, base truncate to shallowly cordate. Leaves on fertile stems petiolate; petiole 3–8 mm long; blade linear to oblong, sometimes triangular, hastate

or sagittate, 10–45 mm long, 3–20 mm wide, apex acute to rounded-truncate with a short recurved mucro, base truncate to cordate, basal lobes 1–10 mm long, acute to obtuse, entire, 2-toothed or lobed, ascending lobes absent, terminal lobe oblong, linear to linear-triangular, 10–40 mm long, 3–8 mm wide, entire to slightly undulate, moderately dense to sparsely hairy, hairs silvery, appressed 0.2–0.4 mm long. In upper parts, leaves similar but smaller. Inflorescence solitary, axillary, bracteolate, with solitary flowers; peduncle slender, terete, 8–30 mm long, densely hairy, hairs appressed, 0.3–0.4 mm long; bracteoles opposite, subulate to linear, 0.7–1.8 mm long, 0.4–0.5 mm wide, apex acute, ciliate, moderately to densely hairy on the back; pedicel 3–12 mm long, recurved at fruiting, moderately to densely hairy, hairs appressed 0.2–0.4 mm long. Outer sepals obovate-elliptic to obovate, 2–3 mm long, rarely to 4 mm, 2–3 mm wide, apex rounded to truncate, \pm emarginate, glabrous or with some appressed hairs outside at the base and on the basal margin; inner sepals orbicular to obovate, 2.5–3.5 mm long, 3–3.5 mm wide, apex rounded to truncate, emarginate, mucronulate, base rounded, glabrous. Corolla funnel-shaped, white or pink, with a creamish-green throat, 5–8 mm long, 5–13 mm diameter, flared 2–3 mm above base of the tube; petals 6–9 mm long, 3–6 mm wide, with rounded apiculate lobes, glabrous except for a few hairs around the apex. Stamens 5, slightly unequal; filaments affixed to the corolla tube for 1–1.5 mm from the base, free for 1.8–3 mm with low tubercles, mainly along the margins, from almost the base of the corolla and extending for up to 3 mm; anthers oblong to triangular-oblong, 1–1.3 mm long, 0.5–0.75 mm wide, apex rounded, base sagittate, basal lobes 0.2–0.25 mm long. Ovary ovoid, 1.5–2 mm long, on a well developed disk, 0.2–0.4 mm high, glabrous; style 1.5–2.5 mm long, with cylindrical, falcate, obtuse stigmas, 1.2–2.3 mm long. Capsule globular to globular-ovoid, 5–7 mm long, 5–7 mm diameter, glabrous. Seeds $\frac{1}{4}$ -globular, 3.5–4 mm long, 3–3.5 mm wide, dark brown to honey-coloured, surface finely punctate bearing prominent raised tubercles of fused hairs, usually laterally flattened and of irregular shape, to 0.25 mm high, with interrupted wing comprising fused hair-like structures (Fig. 4B).

Specimens examined: **South Australia.** LAKE EYRE: 1 km S of Paradise Creek, c. 40 km S of Marree, Jun 1978, *Badman* 32 (AD). FLINDERS RANGES: Parachilna Gorge nr Mt Mary, c. 60 km N of Wilpena Pound, Oct 1987, *Browne* 463 (BRI); c. 16 km N of Hawker, Apr 1966, *Copley* 192 (AD); 8 miles E of Wilmington, Mar 1959, *Filson* 809 (MEL, AD); 5.1 km N of Fred Hughes (Eukaby) Gold Mine, Parachilna, Sep 1987, *Vonow* 584 (BRI). EASTERN: c. 6 km NE of Curnamona (Arkipena Springs road), Apr 1968, *Barker* 454 (AD); c. 3 km N of Curnamona Homestead, Apr 1968, *Orchard* 211 (AD); Oak Park Homestead, c. 50 km S of Yunta, Mar 1969, *Pfeiffer & Pfeiffer* s.n. (AD). NORTHERN LOFTY: reserve between Gladstone and Laura, Nov 1920, *J.M. Black Herb.* s.n. (AD). MURRAY: Upper Murray Mallee, E of Sutherlands, c. 105 km NE of Adelaide, Oct 1962, *Boehm* 376 (AD). **New South Wales.** 0.5 miles W of Fowlers Gap Research Station, May 1954, *Briggs* s.n. (NE); 42 km E of Broken Hill on Barrier Highway to Wilcannia, Nov 1989, *Palmer* 282 (CANB). **Victoria.** WIMMERA: Wimmera, *F. Mueller Herb.* [*Dallachy?*] (MEL 689646, 689644).

Distribution and habitat: *C. microsepalus* is known mainly from eastern South Australia, where it occurs in the Flinders Ranges and surrounding areas. Two specimens of it on sheets bearing F. Mueller labels were collected from the Wimmera area. It has also been recorded from south-western NSW (Map 1). It grows in gravelly clay loam or loamy soils on open plains carrying chenopod shrublands.

Affinities: *C. microsepalus* most closely resembles *C. remotus* in leaf shape and indumentum. However the sepals of *C. remotus* are about twice as long, are apiculate, not \pm emarginate, and are hairy. The corolla of *C. remotus* is also much larger. The sepals of *C. microsepalus* most closely resemble those of *C. arvensis* but the latter has a corolla at least twice as large.

Phenology: The main flowering period is from late winter to early autumn but flowers have occasionally been recorded at other times. Capsules are produced from spring onwards.

Notes: *C. microsepalus* was first described as *Convolvulus* sp. A in the Flora of South Australia (Johnson 1986).

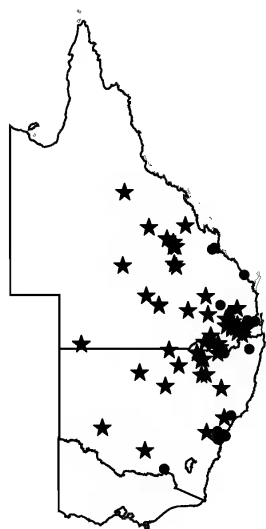
Etymology: The specific epithet refers to the size of the sepals in this species which are by far the smallest of any species of *Convolvulus* recorded from Australia.

3. *Convolvulus graminetinus* R.W. Johnson, sp. nov. affinis *C. remoto* R.Br. sed corollis et sepalis minor, pedicellis ad fructificantem recurvis et paginis seminum differt. **Typus:** Queensland. LEICHHARDT DISTRICT: Gregory Mine Site (23°10'S 148°22'E), 50 km NE of Emerald, 25 November 1998, *R.W. Johnson* 5300 (holo: BRI; iso: BRI, CANB, NE, NSW).

Perennial with trailing and mainly twining stems; stems terete often ribbed, moderately to sparsely hairy, glabrescent, hairs crisped-appressed, mainly 0.2–0.35 mm long, rarely longer to 0.7 mm and more loosely appressed to ascending. Leaves may or may not vary in shape from base to tip of the stem (Fig. 3C). Basal leaves petiolate; petiole long, often equal to or longer than the blade; blade oblong-triangular to linear-triangular, commonly hastate, 24–40 mm long, 6–16 mm wide, apex acute to rounded, mucronulate, base cordate, basal lobes entire or 2-toothed, margin \pm entire occasionally undulate, \pm glabrous to very sparsely hairy, hairs crisped, appressed to ascending, 0.25–0.5 mm long. Leaves on fertile stems petiolate; petiole short, 2–10(–20) mm long; blade linear, triangular-ovate to narrow elliptic, hastate or sagittate, 15–60 mm long, 2–15 mm wide, apex acute, mucronulate, base cordate to truncate, slightly decurrent, basal lobes linear, 1–10(–15) mm long, entire, two-toothed or lobed, or with a short recurved tooth or lobe on the lower margin, ascending lobes absent or occasionally becoming prominent in terminal parts, linear, to 25 mm long and 1–3 mm wide, margin \pm entire, terminal lobe narrow-linear or narrow-elliptic to narrow-oblong, oblong-elliptic or narrow-ovate, 20–55 mm long, 2–8 mm wide, margin \pm entire to undulate, occasionally with a few lobes on more basal leaves, \pm glabrous to very sparsely hairy above, rarely denser, sparse below, hairs crisped-appressed to ascending, 0.1–0.5 mm long. In upper parts, petiole and blade shorter and lobes narrower. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium with 1–2 flowers, or occasionally with 2 inflorescences per axil; peduncle terete, wiry, 7–55 mm long, moderately to sparsely hairy, hairs crisped-appressed, 0.15–0.3 mm long; bracteoles opposite to subopposite, occasionally alternate, linear to subulate, 1–2

mm long, 0.35–0.5 mm wide, apex acute, with or without cilia, \pm glabrous or very sparsely hairy on the back; pedicel 3–12 mm long, recurved at fruiting, hairs as for peduncle, sometimes denser. Outer sepals obovate to elliptic or oblong, 3–5(–5.5) mm long, 2.2–3.8 mm wide, apex acute to obtuse-rounded with a short recurved apiculum, \pm ciliate, \pm glabrous to sparsely hairy, rarely denser, outside, hairs crisped, \pm appressed to ascending, 0.1–0.4 mm long; inner sepals obovate, obovate-orbicular to broadly elliptic, 3.5–5 mm long, 2.5–4 mm wide, apex rounded, occasionally acuminate, with a short recurved apiculum, base rounded to truncate, glabrous or with a few hairs at the tip. Corolla funnel shaped, pink, occasionally white, with a greenish-cream throat, 6–10 mm long, 7.5–15 mm diameter, flared 3–3.8 mm above the base of the tube; petals 7–11 mm long, 4–7 mm wide, with rounded-triangular, apiculate lobes, glabrous except for hairs on the outside of the midpetaline band for 2–3 mm from the apex. Stamens 5, unequal; filaments affixed to the corolla tube for 1.5–2.5 mm from the base, free for 1.6–3.5 mm, with low tubercles from 0.5 mm above the base of the corolla and extending for 2–3.5 mm; anthers oblong to ovate-oblong, 0.8–1.5 mm long, 0.55–0.85 mm wide, apex obtuse, base sagittate, basal lobes 0.15–0.4 mm long. Ovary ovoid, 1–1.3 mm long, on an undulate disk 0.25–0.4 mm high, glabrous; style 2.5–4 mm long, with cylindrical, slightly flattened, obtuse stigmas, 1.4–2.2 mm long. Capsule globular, 4–5.5 mm long and diameter, glabrous. Seeds 4, $\frac{1}{4}$ -globular to $\frac{1}{4}$ -obovoid-globular, 2.5–3(–3.5) mm long, 2–3 mm wide, dark brown to black, surface finely punctate bearing low, laterally flattened, wavy tubercles forming a close regular pattern, wingless (Fig. 4C).

Selected specimens (64 specimens examined): Queensland. NORTH KENNEDY DISTRICT: 72 km NW of Pentland, Jun 1993, *Thompson & Figg* HUG443 (BRI). MITCHELL DISTRICT: Thornleigh Ck, stockroute Malverton to Gowan Hills, 70 km W of Blackall, Nov 1975, *Johnson* 3017 (BRI). SOUTH KENNEDY DISTRICT: 150 km NW of Clermont, Aug 1977, *Dale* 169 (BRI). LEICHHARDT DISTRICT: Peak Downs, Jun 1951, *Everist* 4378 (BRI); 13 km SE of Capella, Mar 1995, *Fensham* 2803 (BRI). BURNETT DISTRICT: Kingaroy, Oct 1949, *Benham* s.n. (BRI). WARREGO DISTRICT: Morven, Apr 1936, *Blake* 10996 (BRI); Pinnacle Station, W of Augathella, Mar 1982, *Greenfield* JT1090 (BRI). MARANOA DISTRICT: 10 miles SE of Roma, Apr 1961, *Johnson* 2075 (BRI). DARLING DOWNS DISTRICT: between



Map 2. Distribution of ★. *Convolvulus graminetinus*. ●. *C. erubescens*.

Clifton and Allora, Nov 1946, *Everist & Webb* 1251 (BRI); 7 km SW of Toowoomba, Apr 1994, *Fensham* 1736 (BRI). MORETON DISTRICT: Cowley Vale, 16 miles E of Helidon, Aug 1969, *Schroder* s.n. (BRI). **New South Wales.** c. 13 km WSW of Moree on road to Collarenebri, Sep 1975, *Henderson* H2352 (BRI); Tamworth District, Feb 1967, *Loveridge* s.n. (NSW); Twenty-one Mile Warrambool between Walgett and Collarenebri, Nov 1967, *McGillivray* 2785 (NSW); 5.5 km W of North Star, near entrance to "Mungle", Sep 1988, *Moore* 8792 (CANB); 4 km S of Melton Grove on Darnick road, just N of Willandra, May 1994, *Porteners & Benson* 9405019 (NSW); 10 miles NE of Yetman, Nov 1952, *SWQS* 1317 (BRI); Iolanthe, c. 25 km SW of Garah, Apr 1976, *Wilson* 1470 (NSW).

Distribution and habitat: *C. graminetinus* is widespread throughout the semi-arid and subhumid regions of Queensland and New South Wales though it extends into coastal areas in south-east Queensland (Map 2). It occurs mainly on clay soils on alluvial plains with *Eucalyptus coolabah* and *E. tereticornis* and on rolling downs, often derived from basalt, dominated by *Dichanthium sericeum*. In north-eastern NSW it is found in *Eucalyptus albens* woodlands on clay to clay loam soils and in *Acacia harpophylla* - *Casuarina cristata* woodlands. In drier areas it occurs on clay soil downs with chenopods.

Affinities: *C. graminetinus* appears most closely related to *C. erubescens* with its similar crisped appressed hairs, and its tendency for

the stems and peduncles to be slightly ribbed. Its seeds have a similar surface pattern and the inflorescence tends to be a one-sided dichasium with 1 or 2 flowers. *C. erubescens* grows in moister *Eucalyptus* forests and on the edges of rainforest whereas *C. graminetinus* is found in grasslands and marginal brigalow woodlands on heavy clay soils in sub-humid to arid areas. Plants with hastate-sagittate leaves resemble those of *C. remotus*. However, *C. graminetinus* has smaller and less hairy sepals, smaller flowers and the seeds are quite different in size, shape and surface pattern.

Phenology: Flowering and fruiting occurs throughout the summer to early winter (November-June).

Notes: Throughout central Queensland, populations of *C. graminetinus* tend to have hastate leaves, ± glabrous sepals and crisped appressed hairs though plants with leaves bearing prominent ascending lobes are found. Similar populations are found through the north western plains of New South Wales with the presence of ascending lobes on leaves becoming more common. However, in the north western slopes region of that state, some populations, such as *Moore* 9108 (CANB) have many spreading hairs on leaves, stems and sepals. Aside from this character, the leaves are often deeply divided with well developed ascending lobes. Two specimens *Hoskings* 1608 and 1681 (NSW) from the same population in Oxley Park, Tamworth are revealing. *Hoskings* 1608 collected in October 1998 features typical short crisped appressed hairs and ± glabrous sepals in contrast to the specimen collected in February 1999 which bears moderately dense spreading hairs on leaves and sepals similar to those in *Moore* 9108. A specimen collected by J. Crawford from near Bingera (CBG12272) contains two separate branches, each branch representing the two different forms described above. The specimen, *Porteners & Benson* 9405019, was collected at a distance from the main area of distribution of this species. It has longer hairs, longer bracteoles, much hairier sepals, commonly 2 inflorescences per axil and larger seeds than do the other specimens. *Wilson* 1470 also has large seeds but it otherwise agrees morphologically with specimens of *C. graminetinus* from Queensland.

This species has been recorded as a weed of cultivation on clay soils on the Darling Downs and Central Highlands of Queensland.

Etymology: The specific epithet is derived from the latin *graminetum*, meaning grassland, and *-inum*, belonging to. This refers to the most common habitat where this species occurs.

Conservation Status: This species is widespread and not endangered at present.

4. *Convolvulus remotus* R.Br., Prod.: 483 (1810). **Type:** Australia: South Coast [Port Lincoln, 4 March 1802], *R. Brown* (holo: BM; iso: MEL[MEL689915]).

Convolvulus preissii de Vriese in Lehmann, *Plantae Preissianae* 1: 346 (1845). **Type:** Ad promontorium Cape Riche, 21 Nov 1840, *Herb. Preiss* no. 1927 (holo: LD).

Convolvulus huegelii de Vriese in Lehmann, *Plantae Preissianae* 1: 346 (1845). **Type:** In solo limoso haud longe a praedio rustico Maddington, ad flumiun Canning River, 2 Nov 1839, *Herb. Preiss* no. 1928 (holo: LD).

Perennial with twining, sometimes trailing, stems; stems terete, sparsely to densely hairy, hairs short, appressed 0.2–0.4(–0.6) mm long. Leaves somewhat variable in shape and size from base to tip of the stem (Fig. 3D). Basal leaves petiolate; petiole often longer than the blade, 12–20 mm long; blade triangular, triangular-oblong to triangular-ovate, bluntly hastate to sagittate, 10–30 mm long, 3–12 mm wide, apex acute to rounded, sometimes emarginate, mucronate, base truncate, decurrent, terminal lobe entire to slightly undulate, sparsely hairy above, slightly denser below, hairs appressed, rarely spreading, 0.1–0.4(–0.5) mm long. Leaves on fertile stems petiolate; petiole 2–20 mm long; blade ovate to triangular or triangular-oblong, bluntly hastate to auriculate-sagittate, 10–80 mm long, 5–40 mm wide, apex acute to rounded, sometimes emarginate, mucronate, base cordate, rarely truncate, basal lobes spreading or recurved, to 10 mm long, obtuse, entire, sometimes 2-toothed, occasionally with a distinct recurved lobe from the lower margin, very rarely with a short ascending lobe, terminal lobe linear or oblong, often triangular,

occasionally narrow elliptic, to 67 mm long, 2–17 mm wide, entire or rarely slightly undulate, moderately to densely hairy above, more rarely sparsely hairy, similar to slightly denser below, hairs appressed, 0.1–0.4(–0.5) mm long, silvery. In upper parts, petiole shorter and blades smaller with narrower lobes. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium, with 1–2, rarely 3, flowers, or rarely with 2 inflorescences per axil; peduncle filiform, 5–42 mm long, moderately to densely hairy, hairs appressed, 0.2–0.4 mm long; bracteoles opposite to sub-opposite, subulate to linear, 1.3–3 mm long, 0.25–0.5 mm wide, apex acute, ciliate, moderately to sparsely hairy on the back; pedicel 3–16 mm long, hairs as for peduncle. Outer sepals broadly elliptic to almost orbicular, occasionally slightly obovate, 5–6.5(–7) mm long, 3.5–4.5(–5.5) mm wide, apex obtuse to rounded, often shortly apiculate, mucronate, usually ciliate, moderately to densely, rarely sparsely, hairy outside, hairs mainly appressed, 0.2–0.4(–0.6) mm long; inner sepals broadly elliptic to almost orbicular, often obovate-elliptic, rarely ovate-elliptic, 4.2–6 mm long, 3–4.5 mm wide, apex rounded, shortly apiculate, mucronate, base truncate, face glabrous to sparsely hairy. Corolla funnel-shaped, pink to pale pink, occasionally white, mauve or reddish-purple, midpetaline band brownish-yellow on the outside, throat creamish-green, 8–12 mm long, 8–20 mm diameter, flared 3.5–5 mm above the base of the tube; petals 9–18 mm long, 4–11 mm wide, with rounded-triangular, emarginate lobes, often with a short apiculum, glabrous except for hairs on the outside of the midpetaline band for up to 5 mm from the apex. Stamens 5, slightly unequal in length; filaments affixed to the corolla tube for 1.5–3.5 mm from the base, free for 2–5 mm, with low tubercles from just above the base of the corolla and extending for 2.5–5 mm; anthers oblong to triangular-oblong, 1–2 mm long, 0.6–1 mm wide, apex rounded to emarginate, base sagittate, basal lobes 0.2–0.5 mm long. Ovary ovoid, 1–2.5 mm long, on a prominent disk, 0.3–0.5 mm high, glabrous; style 3.5–6 mm long, with cylindrical to slightly obovate, obtuse stigmas, 1.3–2.5 mm long. Capsule globular to globular-ovoid, 5.5–8.5 mm long, 5–7 mm diameter, glabrous. Seeds 4, ¼-ellipsoid or ¼-globular-ellipsoid, 3–4.8 mm long, 2–3 mm wide, brown to dark brown

often with irregular darker patches and stripes, surface finely punctate bearing low irregular \pm anastomosing ridges and tubercles and a narrow \pm continuous to broken wing on the outer margins (Fig. 4D).

Selected specimens (309 specimens examined): **Western Australia.** 201 miles E of Kalgoorlie on Trans-Australian Railway, Jun 1964, *Aplin & Trudgen* 5762 (PERTH); 1.3 km S on Keating road, Chittering, Dec 1981, *Cranfield* 1980 (PERTH); 97 km NW of Forrest, Apr 1984, *Downing* 919 (PERTH); Rocky Pool, Gascoyne River, c. 850 km N of Perth, Oct 1975, *Kenneally* 4643 (PERTH). **Northern Territory.** Palm Valley, Jul 1965, *Beaglehole* 10409 (BRI); Bond Gap, Simpsons Gap National Park, Nov 1980, *Latz* 8530 (DNA, BRI); Mt Benstead Creek, c. 50 km ENE of Alice Springs, Jun 1984, *Latz* 9928 (DNA, BRI). **South Australia.** 12 miles N of Bordertown, Nov 1964, *Beaglehole* 19821 (AD); c. 5 km NE of McLaren Flat, c. 30 km S of Adelaide, Dec 1976, *Bell* 75 (AD); Beresford Hill, Oct 1978, *Chorney* 991 (AD); 25 km E of Watson, Aug 1980, *Weber* 6588 (AD); c. 1 km N of Nudlamutana Well, c. 20 km N of Balcanoona, Oct 1967, *Whibley* 2180 (AD). **Queensland.** "Budgerygar", 64 km SW of Yarakka, Nov 1975, *Johnson* 3045, 3111 (BRI). **New South Wales.** Delta road junction, Sturt Highway, E of Wentworth, May 1979, *Fox* 7905071 (NSW); NE edge of Narran Lake, Brewarrina, Nov 1967, *McGillivray* 2856 (NSW); 26 miles N of Wentworth on road to Broken Hill, Aug 1969, *Rodd* s.n. (NSW); Depot Glen, 12 km N of Milparinka, Sep 1990, *Wilson* 1646 (NSW). **Victoria.** GRAMPIANS: Mt Arapiles, S side, upper reaches of N arm of golf course gorge, Nov 1968, *Beaglehole* 29687 (MEL). MURRAY MALLEE: Lake Hindmarsh Reserve, Dec 1986, *Beaglehole* 87629 & *Huebner* (MEL); Lake Wallawalla area, c. 4 km NW of causeway on Lake Wallawalla, Dec 1988, *Browne* 566 (LTB, BRI); Thurla, South Cardross Lakes, Dec 1964, *Chandler* ACB19687 (MEL).

Distribution and habitat: *C. remotus* occurs mainly south of the Tropic of Capricorn in all mainland states. It is also absent from eastern coastal areas (Map 3). It occurs on a wide variety of soil types from clays through loams to sands. In more arid areas, it occurs on sandhills in *Zygochloa* grasslands as well as on alluvial soils along drainage lines. It is commonly found in chenopod shrublands with bluebush and saltbush. In semi-arid areas, it has been recorded from *Acacia* shrublands, including mulga, and from open mallee woodlands and heaths.

Affinities: *C. remotus* does not appear to be closely related to the other Australian species. As noted under *C. graminetinus*, sterile specimens can resemble those of that species.

Phenology: Flowering occurs throughout the year but mainly in spring and early summer (August–December); fruit are found mainly in spring to early autumn.

Etymology: Unknown

Conservation Status: This species is widespread and not endangered at present.

5. *Convolvulus crispifolius* F. Muell., Linnaea 25:423 (1853), (as "crispifolias"). **Type:** South Australia. In montibus nudis petraeis aliquot milliaria Anglica directione boreali-orientali a Cudnaka, October 1851, *F. Mueller* s.n. (holo: MEL[MEL1544962]; iso: MEL[MEL689518]).

Perennial with short trailing stems, rarely to 1 m long; stems wiry, terete, moderately to densely hairy, becoming less densely hairy with age, hairs appressed to loosely ascending, 0.2–1 mm long. Leaves somewhat variable in shape and size from base to tip of the stem (Fig. 5A). Basal leaves petiolate; petiole long, often longer than the blade; blade ovate, oblong-ovate to triangular-ovate, lacking distinct basal lobes, 10–20 mm long, 4–18 mm wide, apex obtuse to rounded, base truncate to shallowly cordate, margin crenate, moderately to densely hairy, hairs appressed, 0.15–0.6 mm long. Leaves on fertile stems petiolate; petiole short, 2–15 mm long; blade ovate, oblong-ovate to triangular-ovate, sometimes slightly hastate, 5–25 mm long, 4–15 mm wide, apex acute to truncate, base cordate, \pm decurrent, margin unevenly crenate to bluntly serrate, with 7–10 teeth per side, more deeply indented towards the base or with short basal lobes, moderately to densely hairy, hairs appressed, 0.3–0.8 mm long. In upper parts, basal and ascending lobes becoming more prominent but rarely exceeding 3 mm in length. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium with 1–2 flowers; peduncle terete, 2–12 mm long, rarely extending to 20 mm at fruiting, moderately to densely sericeous, hairs appressed to loosely ascending, 0.2–0.5 mm long; bracteoles opposite, linear-subulate to narrowly ovate, 1.2–2.2 mm long, 0.25–0.3 mm wide, apex acute, ciliate, densely hairy on the back; pedicel 1.5–4 mm long, recurved at fruiting, hairs as

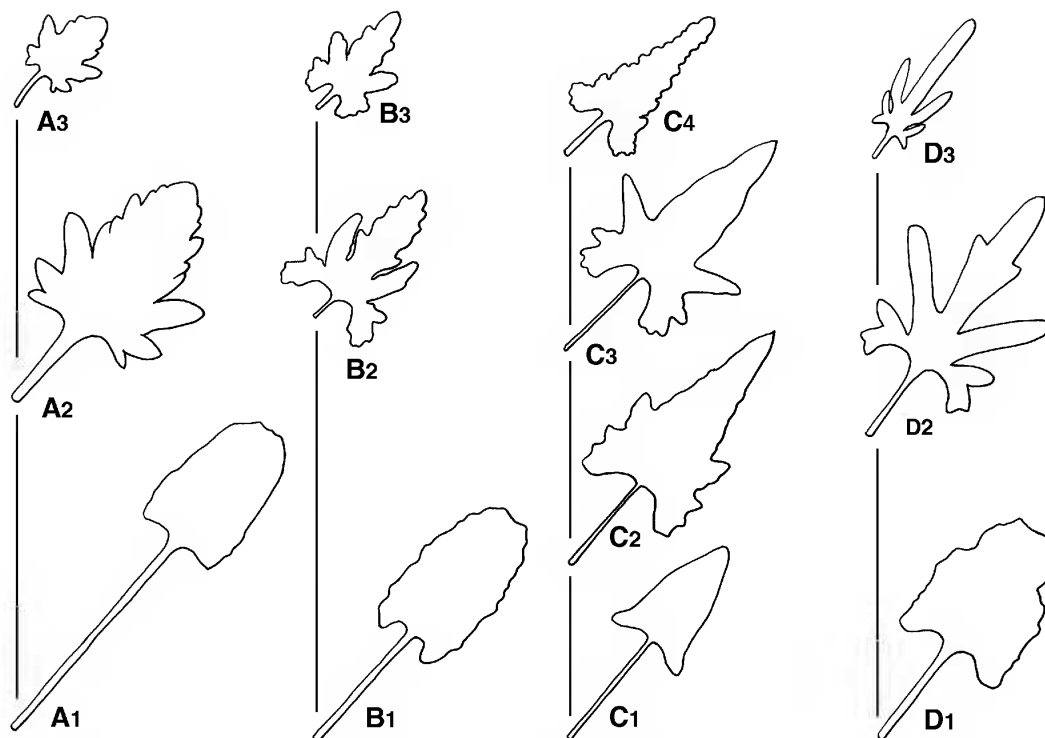
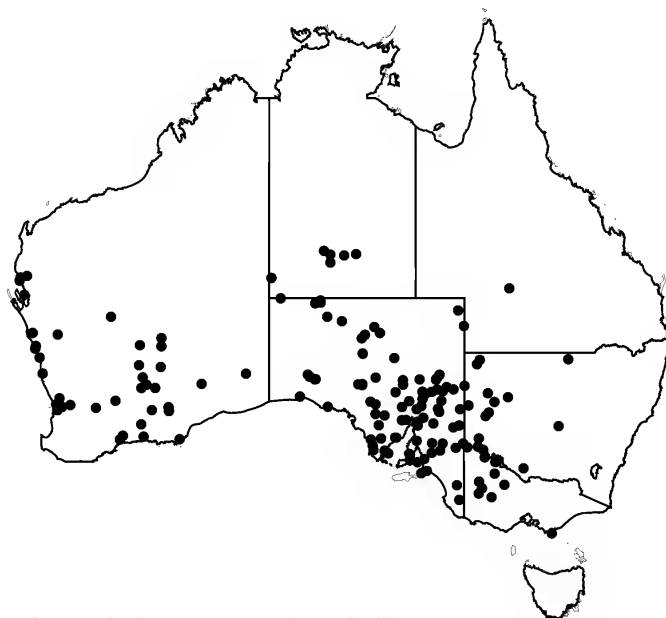


Fig. 5. Variation in leaf shape of *Convolvulus* species from base to tip of stems A. *C. crispifolius*. (1) Copley 571 (AD) $\times 1$, (2,3) Chinnock 2915 (AD) $\times 2$; B. *C. eyreanus*. (1) Kuchel 884 (AD) $\times 1$, (2) Hill 163 (AD) $\times 0.5$; (3) Hill 163 (AD) $\times 1$; C. *C. erubescens*. (1) Johnson & Pedley 453 (BRI) $\times 0.5$, (2) Simmonds s.n. (BRI-AQ275832) $\times 0.5$, (3) Hind s.n. (NSW198642) $\times 0.5$, (4) McBarron 12570 (NSW) $\times 2$; D. *C. wimmerensis* $\times 1$. (1) Beaglehole ACB83982 (MEL) (2,3) Beaglehole ACB86599 (MEL). Del. W. Smith.



Map 3. Distribution of *Convolvulus remotus*. Del. W. Smith.

for peduncle. Outer sepals obovate to obovate-elliptic, 4–4.5 mm long, 3–3.7 mm wide, apex rounded-obtuse with a distinct recurved apiculum, moderately to densely ciliate, sericeous outside, hairs appressed to loosely ascending, 0.25–0.7 mm long; inner sepals obovate to obovate-elliptic or obovate-orbicular, 3.6–4.3 mm long, 3–4 mm wide, apex rounded or truncate, shortly apiculate, base obtuse to truncate, glabrous or with hairs on the midrib. Corolla funnel-shaped, white to pink, with a whitish-green throat, 5–6 mm long, 6–8 mm diameter, flared 3–4 mm above the base of the tube; petals 6–8 mm long, 2.5–3.5 mm wide, with irregularly rounded, bluntly apiculate lobes, glabrous except for sericeous hairs on the outside of the midpetaline band for 2–2.5 mm from the apex. Stamens 5, unequal; filaments affixed to the corolla tube for 1.5–2 mm from the base, free for 1.5–2.8 mm, with low tubercles, mainly along the margins, from almost the base of the corolla and extending for 2–3 mm; anthers oblong to ovate, 0.65–0.75 mm long, 0.5–0.7 mm wide, apex truncate or rounded, sometimes emarginate or apiculate, base sagittate, basal lobes 0.1–0.15 mm long. Ovary ovoid to ovoid-elliptic, 1–1.25 mm long, on a distinct disk 0.25–0.3 mm high, glabrous; style furrowed, 2–2.5 mm long, with cylindrical to narrowly ellipsoid, obtuse stigmas, 1.2–1.5 mm long. Capsule globular to globular-ovoid, 4–4.5 mm long, 4–4.5 mm diameter, glabrous. Seeds 4, ¼ globular, 2.4–3 mm long, 1.75–2 mm wide, dark brown to black, surface finely punctate bearing low, short irregular sinuate ridges and a narrow, ± continuous wing of fused hair follicles, 0.1–0.15 mm wide (Fig. 6A).

Specimens examined: **South Australia.** FLINDERS RANGES: Wilpena Pound, Sep 1989, *Bates* 20915 (BRI). EYRE PENINSULA: Hundred of Hawker, Lincoln Highway, c. 16 km S of Elbow Hill, Jul 1965, *Alcock* 652 (AD); Hundred of Hambidge, Flora & Fauna Reserve, Prominent Hill, NE of Loch, Sep 1965, *Alcock* 1063 (AD); Lincoln Highway, N of Elbow Hill, Nov 1965, *Alcock*, s.n. (AD); Hambidge Flora & Fauna Reserve, W of Prominent Hill, NE of Lock, Oct 1966, *Alcock* 1151 (AD); Crown lands, WNW of Kimba, Oct 1981, *Alcock* 9001 (AD); 23 km NE of Poochera, N of Karoontaby, Oct 1975, *Chinnock* 2915 (AD); Mount Ive, Gawler Ranges, c. 160 km W of Port Augusta, Sep 1969, *Donner* 3242 (AD); between Cowell and Arno Bay, Nov 1961, *Kraehenbuehl* 526 (AD); junction of Sections 24 & 14, Hundred of Verran, c. 95 km NNE of Port Lincoln, Oct 1963, *Kuchel* 1470 (AD); County

Buxton, Pinkawillinie, c. 36 km WNW of Kimba, Feb 1959, *Rohrlach* 166 (AD); Price Beach, Oct 1983 *Toelken* 7741 (BRI); c. 5 km NE of Corrobinie Hill, Oct 1981, *Weber* 6932 (AD). YORKE PENINSULA: Hundred of Wiltunga, NW corner of Sect 168, c. 140 km NNW of Adelaide, Aug 1966, *Copley* 571 (AD); Sect 200, Hundred of Wiltunga, c. 140 km NNW of Adelaide, Nov 1966, *Copley* 876 (AD); Ardrossan, c. 80 km NW of Adelaide, *Tate* s.n. (AD). MURRAY: Berri, Jun 1921 *J.M.Black Herb* s.n.(AD); Berri, Jan 1921, *Cleland* s.n.(AD); Mantung District, c. 140 km ENE of Adelaide, Aug 1924, *Cleland* s.n. (AD); between Overland corner and Barmera, Sep 1965, *Eichler* s.n. (AD). **Victoria.** MURRAY MALLEE: Sunset Country, Pheeny's Track, c.10 km W of S. Bambill Track, Oct 1981, *Browne* 536 (BRI).

Distribution and habitat: *C. crispifolius* is found south of 32°S in the southern part of the Flinders Ranges and in both the Eyre and Yorke Peninsulas of South Australia. Its distribution extends eastward into the Murray-Mallee area and into far western Victoria (Map 4). It occurs on sandy and sandy-loam, sometimes rocky, soils, commonly in mallee scrubs, and on sandhills.

Affinities: *C. crispifolius* appears most closely related to *C. eyreanus*. Johnson (1987), in describing *C. eyreanus*, referred to a form of that species with small serrate, silvery coloured leaves which he considered may prove taxonomically distinct. This form is now considered referable to *C. crispifolius*. The latter species can be distinguished from *C. eyreanus* by its small crenate, silvery coloured leaves, its shorter pedicels and its smaller seeds and capsules. *C. eyreanus* has a more vigorous twining habit; branches from the crown in *C. crispifolius* are mainly prostrate and non-twining.

Phenology: Flowering has been recorded mainly from spring to early summer with fruiting extending into the late summer.

Notes: Though this species was described in 1853, the name has rarely appeared in print. Strangely, Bentham (1869) did not take account of the name and appeared unaware of its publication. Under *C. erubescens* Sims he remarked on a remarkable form or variety “.. with the leaves very densely tomentose and much-cut and crisped and the peduncles very short from Cudnaka” which had been collected by Mueller. This specimen had been selected by Mueller as the type for the name of his species,

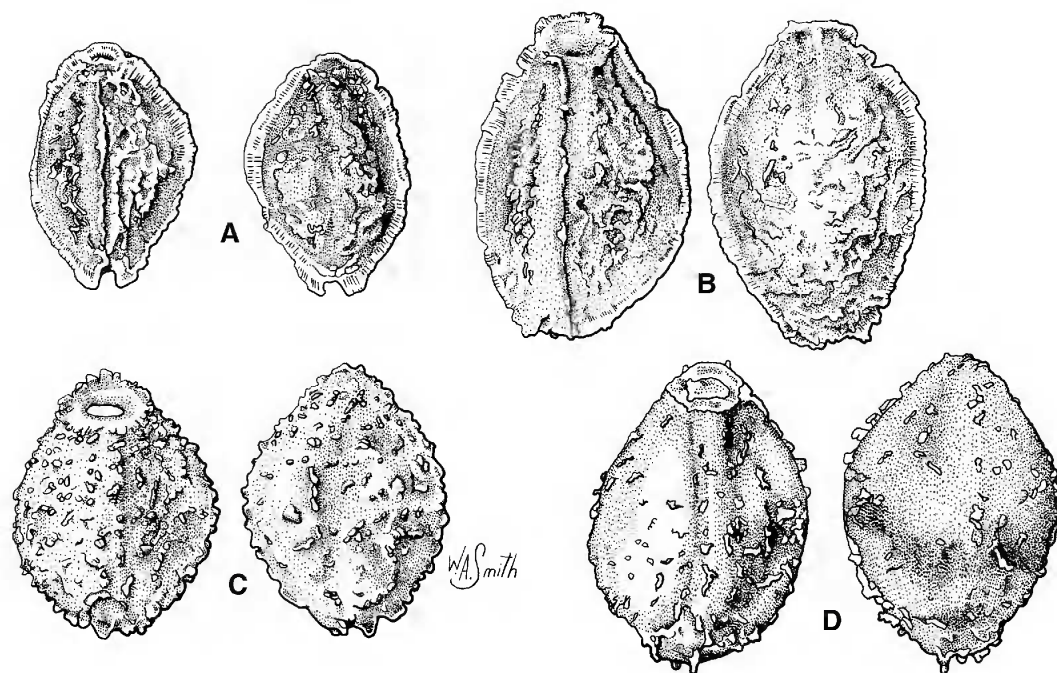
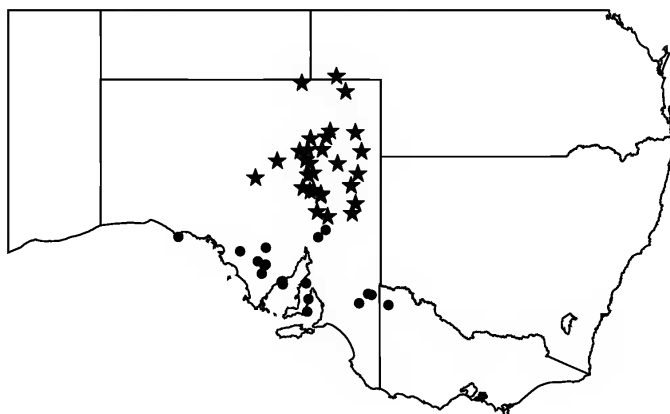


Fig. 6. Seeds of *Convolvulus* species, adaxial (L.H.S.) and abaxial (R.H.S.) surfaces $\times 10$. A. *C. crispifolius* from Chinnock 2915 (AD); B. *C. eyreanus* from Donner 3531 (AD); C. *C. erubescens* from Johnson 1801 (BRI); D. *C. wimmerensis* from Beaglehole ACB82670 (MEL). Del. W. Smith.



Map 4. Distribution of ●. *Convolvulus crispifolius*. ★. *C. eyreanus*. Del. W. Smith.

C. crispifolius. Mueller (1864) wrote of the extreme variation existing within *C. erubescens* and reduced *C. crispifolius* (now spelt as *C. crispifolius*) to synonymy under *C. erubescens*. I was not aware of its existence until after *C. eyreanus* was described.

Etymology: The specific epithet refers to the characteristically unevenly crenate to bluntly serrate margins of the leaves.

6. *Convolvulus eyreanus* R.W. Johnson, *Austrobaileya* 2:408 (1987). **Type:** South Australia: Frome East, c. 40 km ENE of Frome Downs Homestead, 23 July 1971, *N.N. Donner* 3531 (holo: AD; iso: Altona Springs, Oshkosh, n.v.).

Perennial with trailing and twining stems; stems terete, sericeous, moderate to densely hairy on younger parts becoming less dense with age, hairs appressed to ascending, 0.2–0.7 mm long. Leaves variable in shape and size from base to tip of the stem (Fig. 5B). Basal leaves petiolate; petiole 3–25 mm long; blade oblong to oblong-triangular, barely hastate, 8–20 mm long, 3–18 mm wide, apex truncate, mucronulate, base truncate to barely cordate, margin undulate, toothed or lobed, with 6–7 lobes/side, moderately to densely hairy, hairs \pm appressed, 0.2–0.7 mm long. Leaves on fertile stems petiolate; petiole 1–10(–12) mm long; blade ovate to oblong, hastate or sagittate, 7–35 mm long, 3–20 mm wide, apex acute to rounded, mucronulate, base cordate, margin serrate to shallowly lobed, basal lobes often more prominent, 2–10(–20) mm long, entire to 2 or 3-lobed, ascending lobes linear, 3–16(–22) mm long, entire to shallowly lobed, terminal lobe linear to oblong, crenate to shallowly lobed with 5–8 lobes or rounded teeth, densely sericeous and silvery on both sides, hairs 0.2–0.6 mm long, \pm appressed. On terminal branches, basal lobes becoming more prominent with ascending lobes to 7–8 mm and basal 2–3 mm long, often with a secondary recurved 3-toothed lobe. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium with 1 or 2, rarely 3 flowers; peduncle slender, terete, 10–30(–60) mm long, moderately to densely hairy, hairs appressed to ascending, occasionally erect, 0.2–0.5 mm long; bracteoles opposite to subopposite, linear to subulate, 1–3 mm long,

0.3–0.5 mm wide, apex acute, moderately to densely ciliate, cilia 0.25–0.5 mm long, moderately to densely hairy on the back, hairs \pm appressed to ascending, 0.2–0.5 mm long; pedicels terete, 1–10 mm long, hairs as for peduncle. Outer sepals obovate, obovate-elliptic to obovate-oblong, 4.2–5.5 mm long, 3–4 mm wide, apex bluntly acute to rounded with a short recurved apiculum, moderately ciliate, cilia 0.3–0.7 mm long, sparsest at the tip, moderately to densely hairy outside, hairs \pm appressed to ascending, 0.2–0.6 mm long; inner sepals obovate, 3.2–4.5 mm long, 3–3.7 mm wide, apex rounded, abruptly acuminate, with a short recurved apiculum, base rounded to obtuse, glabrous or with occasional hairs mainly on midrib and at base. Corolla funnel-shaped, off-white to pink, 6–8 mm long, 6–10 mm diameter, flared 3.5–4 mm above the base of the tube; petals 8–9 mm long, 3.7–4.5 mm wide, with well developed rounded-triangular and obtuse lobes, glabrous except for some appressed hairs on the outside of the midpetaline band for 2.5–3 mm from apex. Stamens 5, unequal; filaments affixed to the corolla tube for 1.8–2 mm from the base, free for 2–4.3 mm, with low tubercles to 0.1 mm long, mainly along the margins, from almost the base of corolla and extending for 2–3 mm; anthers oblong to triangular-ovate, 0.75–0.95 mm long, 0.55–0.7 mm wide, apex obtuse to rounded, apiculate, base sagittate, basal lobes 0.1–0.2 mm long. Ovary ovoid, c. 1 mm long, on a disk 0.2–0.3 mm high, glabrous or with an occasional hair in the upper part; style 2.7–3 mm long, glabrous or hairy, with cylindrical to very narrowly ellipsoid, occasionally falcate, stigmas, 1–1.4 mm long. Capsule globular to globular-ovoid, 6–7 mm long, 5–5.5 mm diameter, glabrous or with a few hairs at the apex. Seeds 4, $\frac{1}{4}$ -globular, 3.2–4.4 mm long, 2.3–3 mm wide, dark brown, surface finely punctate bearing irregular shaped tubercles or short wavy ridges, with a narrow discontinuous to \pm continuous wing, 0.1–0.2 mm wide (Fig. 6B).

Selected specimens (43 specimens examined): **South Australia.** LAKE EYRE REGION: Far N Lake Eyre, Central Hunt Peninsula, just N of Muloorina H/S, Sep 1968, *Cornwall* 109 (AD); Mt Gason Bore, Birdsville Track, c. 250 km NE of Marree, Sep 1960, *Filson* 3330 (AD, MEL); Wirragalpina Swamp, c. 46 km WSW of new Stuart H/S, Mar 1984, *Haegi* 3353 (BRI); Muloorina Station between Station and Lake Eyre, Jul 1955, *Hill*

163 (AD); Birdsville Track nr camp at Lake Palankarina, c. 30 km N of Dulkaninna H/S, Mar 1972, *Jackson* 1901 (AD); Mulka Bore Ruins, 3 miles S of new H/S, c.155 km NNE of Marree, Aug 1960, *Lothian & Francis* 280 (AD); Ooroowilanie, c.165 km NNE of Marree, Jul 1960, *SA Pastoral Board* s.n. (AD); just S of Strangways Railway Siding, 53 km E of William Creek, Mar 1983, *Weber* 8851 (BRI). FLINDERS RANGES REGION: Oraparinna National Park, central portion, c. 6 km SSW of headquarters, *Jackson* 1767 (AD); c. 25 km S of Moolawatana Station, c. 140 km ENE of Leigh Creek, Aug 1963, *Kuchel* 884 (AD); c. 8 km W of Yadlakenna Dam, between Myrtle Springs and Termination Hill, Nov 1964, *Lothian* 3385 (AD); Lake Torrens East, Motpena, c. 24 km WSW of Parachilna, Aug 1955, *SA Pastoral Board* s.n. (AD); Ideyaka, Sep 1883, *Tate* s.n. (AD). GAIRDNER-TORRENS REGION: Mulgaria, Aug 1955, *SA Pastoral Board* s.n. (AD); Lake Torrens Basin, c. 15 km W of Yadlakenna Well, c. 30 km NW of Leigh Creek, Nov 1964, *Lothian* 3428 (AD). EASTERN REGION: Frome Downs Station, Oct 1971, *Trezi* 348 (AD); 5 km N of North Mulga Outstation on pipeline, Sep 1987, *Vonow* 702 (BRI); Lake Frome East, Billeroo Creek Area, c. 45 km ENE of Frome Downs Homestead, Jul 1971, *Whibley* 3455 (AD). QUEENSLAND. GREGORY SOUTH DISTRICT: 3 km S of Birdsville via old cement crossing road heading S, Sep 1995, *Edmunds* AD149 (BRI).

Distribution and habitat: *C. eyreanus* occurs throughout the north-eastern parts of South Australia in the basins of Lake Eyre, Lake Torrens and Lake Frome. It also grows in the Simpson Desert extending into Queensland, south of Birdsville (Map 4). It is found mainly on sand dunes and associated habitats, often growing in *Acacia* shrublands.

Affinities: *C. eyreanus* is most closely related to *C. crispifolius*. It also resembles *C. clementii* but can be distinguished from that species by its more sericeous vestiture, more shallowly lobed leaves and its seed size and surface architecture.

Phenology: Flowering and fruiting occurs mainly from the late winter to early summer.

Etymology: The specific epithet refers to the name Eyre in Lake Eyre and the Eyre Region of South Australia, both named in honour of the Australian explorer, Edwin John Eyre (1815-1901).

Conservation Status: This species appears to be widespread in South Australia but is known from only one collection in Queensland.

7. *Convolvulus erubescens* Sims, Curtis's Botanical Magazine 27: t. 1067 (1807)
Type: NSW, *Loddiges* s.n. (holo: not found).

Convolvulus erubescens var. *dilatatus* Choisy in A.DC., Prodr. 9:412 (1845).
Type: "Varietas e cultura nota (described from living plants in the wild - no type) (v.v.)".

Perennial with trailing and twining stems; stems terete, ribbed to narrowly winged, moderately to sparsely hairy, becoming sparser with age, hairs mainly crisped-appressed, 0.2–0.35(–0.5) mm long. Leaves variable in shape and size from base to tip of the stem (Fig. 5C). Basal leaves petiolate; petiole long, often equal to or longer than the blade, 25–35 mm long; blade triangular-ovate, sagittate, 20–45 mm long, 15–27 mm wide, apex obtuse, mucronulate, base cordate, margin undulate to shallowly lobed, basal lobes not prominent, \pm glabrous above, moderately hairy below, hairs crisped, 0.15–0.4 mm long. Leaves on fertile stems petiolate; petiole 2–25 mm long; blade triangular to oblong-triangular, occasionally linear, auriculate to sagittate, 15–60 mm long, 2–40 mm wide, apex acute to obtuse or rounded, occasionally emarginate, apiculate, base cordate, margin lobed, basal lobes auriculate, rounded, slightly prominent with 2–6 teeth or lobes per side, including an ascending lobe becoming more prominent in upper parts, to 20 mm long and 6 mm wide, terminal lobe triangular to oblong triangular, even linear, to 40 mm long and 15 mm wide, margin undulate to shallowly lobed, \pm glabrous to moderately hairy above, moderate to sparse below, hairs crisped-appressed to loosely ascending, occasionally semi-erect, 0.2–0.4(–0.5) mm long. In upper parts, leaves with shorter petioles, blades narrower triangular-ovate, sagittate and basal lobe barely 2-toothed with 4 or 5 undulations per side. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium, with 1–3(–4) flowers, or occasionally with 2 inflorescences per axil; peduncle terete to slightly flattened, ribbed, 10–60 mm long, moderately to sparsely hairy, hairs crisped appressed 0.15–0.4 mm long; bracteoles opposite to distinctly alternate, linear to

subulate, 1–3 mm long, 0.4–0.7 mm wide, apex acute, \pm ciliate, \pm glabrous to sparsely hairy on the back; pedicel \pm ribbed, 5–20 mm long, not or only very slightly recurved at fruiting, hairs similar to and often denser than on the peduncle. Outer sepals obovate to oblong or elliptic, 5–7 mm long, 2.5–5 mm wide, apex acute with a recurved apiculum, \pm ciliate, moderately to sparsely hairy to \pm glabrous outside, hairs crisped, loosely appressed to ascending, 0.15–0.3(–0.5) mm long; inner sepals obovate to elliptic, acuminate, 4.6–6.5 mm long, 3.5–5.5 mm wide, apex acute to obtuse with a distinct curved apiculum, base truncate, \pm glabrous, sometimes sparsely hairy and ciliate. Corolla funnel-shaped, pink or mauve with a pale greenish throat, 7–15 mm long, 8–20 mm diameter, flared 3.5–5 mm above the base of the tube; petals 10–16 mm long, 7–12 mm wide, with rounded-triangular, emarginate to apiculate lobes, glabrous except for hairs on the outside of the midpetaline band for 4–8 mm from the apex. Stamens 5; filaments affixed to the corolla tube for 1.5–3 mm from the base, free for 3–5.2 mm, with low tubercles from 1 mm above the base of the corolla and extending for 1.75–4 mm; anthers broadly oblong to triangular-oblong, 1.4–2.2 mm long, 0.6–0.9 mm wide, apex rounded, emarginate, base sagittate, basal lobes 0.25–0.45 mm long. Ovary globular-ovoid, 1–1.5 mm long, on a distinct disk 0.25–0.5 mm high, glabrous; style 3–7 mm long, with cylindrical, obtuse, stigmas, 1.8–2.35 mm long, suffused with pink. Capsule \pm globular to globular-ovoid, 4.5–6 mm long, 5.5–6.5 mm diameter, glabrous. Seeds 4, $\frac{1}{4}$ -globular, 2.8–3.7 mm long, 2.3–2.5 mm wide, black to dark brown, surface finely punctate bearing numerous small irregular tubercles and no distinct wing (Fig. 6C).

Specimens examined: **Queensland.** PORT CURTIS DISTRICT: Rockhampton, Apr 1867, *O'Shanesy* 55 (MEL); Neeko[o] Creek, s.d., [*Bowman*] s.n. (MEL). BURNETT DISTRICT: Bundaberg, Mar 1980, *Stanley* 919 (BRI). DARLING DOWNS DISTRICT: c. 3 miles S of Mt Mowbullan Guest House on Bunya Mts - Bell road, May 1958, *Johnson & Pedley* 453 (BRI); Atkins Lagoon, Pelican, Jan 1980, *Lithgow* 702 (BRI). MORETON DISTRICT: Tarampa Creek, s.d., *Bailey* s.n. (BRI); Mt Mistake, s.d., *Simmonds* s.n. (BRI). **New South Wales.** Clarence River, s.d., *Beckler* s.n. (MEL); Mt Annan Botanic Garden, Mt Annan Ridge, 4 km W of Campbelltown, Dec 1985, *Hind* s.n. (NSW); St Johns RC Cemerery, Campbelltown, May 1966, *McBarron* 12570 (NSW); Darvall Park, Dennistone, Dec 1978, *Coveny* 10408 (NSW); RC Cemetery, Camden, Oct 1965, *McBarron* 11396 (NSW); 1 mile S

of Cambelltown on Appin Road, Jan 1969, *Coveny* 779 (NSW); South Creek, Rossmore, 10 miles W by S of Liverpool, Apr 1968, *Johnson* 1801 (NSW); Doonside, Feb 1984, *Coveny* 11781 (NSW); Maitland Longbridge on New England Highway, Jan 1981, *Medd* 160021 (NSW); Singleton, Jun 1912, *Breakwell* s.n. (NSW).

Distribution and habitat: *C. erubescens* is found in coastal and sub-coastal areas from the Sydney area in New South Wales to Rockhampton in Queensland (Map 2). It is found mainly in wetter eucalypt forests and in rainforest margins.

Affinities: *C. erubescens* appears most closely related to *C. graminetinus*. However, *C. erubescens* has a larger corolla and longer, straight to sinuate, pedicels at fruiting while in *C. graminetinus* the pedicels are shorter and strongly recurved at fruiting. For more than a century, *C. angustissimus* was regarded as conspecific with *C. erubescens* but the latter has a compound dichasial inflorescence and a distinctly different seed surface pattern which distinguishes it from that species.

Phenology: Flowering occurs throughout the late spring to early autumn with fruits recorded mainly in summer and autumn.

Notes: Though the type specimen was not located, the illustration, given in Curtis's Botanical Magazine and the associated protologue, relate extremely well to the taxon described above. Though no type specimen or description of *C. erubescens* var. *dilatatus* Choisy has been found, based on the specific and subspecific epithets, I have concluded it probably falls within my concept of *C. erubescens*.

Specimens collected in the Sydney area indicate there may have been some gene flow between populations of *C. angustissimus* and *C. erubescens*. Specimens which appear to be of *C. erubescens* occasionally have recurved pedicels but agree with *C. erubescens* in having compound inflorescences, hastate leaves with dentate basal lobes, ribbed peduncles and seeds with closely patterned tubercles, e.g. Perthville, *Schiff* (NSW455842). A specimen labelled as from Yarra Yarra (MEL 689505) appears to belong to this species. However the collecting locality given for it is well outside the normal range of *C. erubescens* and the label information

is queried.

Etymology: The specific epithet refers to the flower colour in this species.

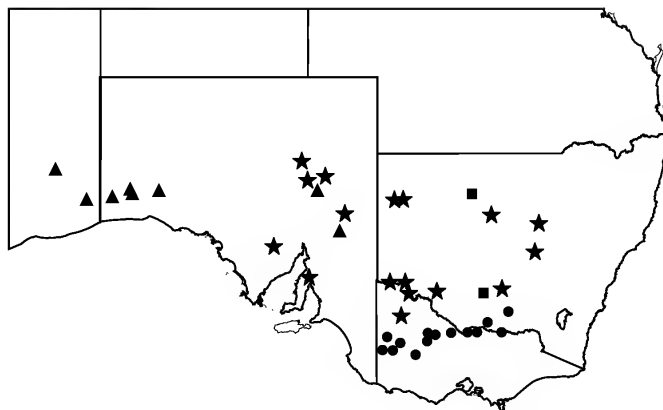
Conservation Status: In Queensland, populations of this species have been considerably reduced since European settlement and no collections have been recorded in the past 20 years. In view of the uncertainty of the current population it is probably best to regard it as rare.

8. *Convolvulus wimmerensis* R.W. Johnson, **sp. nov.** affinis *C. angustissimo* R. Br. sed pilis densis, appressis et argenteis, et inflorescentia dichasiali unilateraliter differt. **Typus:** Victoria. Terrick Terrick State Park M2, 24 November 1985, A.C. Beauglehole 82670 (holo: MEL [MEL689790]).

Perennial with trailing and twining stems; stems terete, moderately to densely hairy, becoming sparser with age, hairs crisped-appressed, silvery, 0.15–0.5 mm long, sometimes with some ascending and occasionally spreading hairs to 0.9 mm. Leaves variable in shape and size from base to tip of the stem (Fig. 5D). Basal leaves petiolate; petiole long, occasionally equalling the blade, 12–20 mm long; blade ovate to oblong, occasionally triangular-oblong, 8–25 mm long, 5–15 mm wide, apex rounded to truncate, sometimes slightly emarginate, base cordate to truncate, decurrent, margin crenate to shallowly lobed, basal lobes soon becoming more prominent, moderately densely hairy to \pm glabrous, hairs ascending to erect, 0.2–0.7 mm long. Leaves on fertile stems petiolate; petiole short 2–10 mm long; blade ovate in outline, 13–30 mm long, 8–20 mm wide, apex obtuse to rounded, rarely acute, base cordate, decurrent, deeply divided almost to the base into 5 lobes, basal pair of lobes linear, 2–12 mm long, toothed or bifid, with a secondary recurved lobe from the lower margin, ascending lobes linear, prominent, often more than half the length of the terminal lobe, up to 20 mm long, terminal lobe linear to narrowly oblong or narrowly obovate 10–25 mm long, 1–5 mm wide, irregularly toothed or lobed particularly on more basal leaves, undulate to entire above, moderately to densely hairy, hairs appressed 0.2–0.5 mm long, silvery. In upper parts, lobes

narrower and entire. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium with 1–2 flowers; peduncle terete, 10–35 mm long, moderately to somewhat densely hairy, hairs short, appressed to slightly ascending 0.15–0.5 mm long; bracteoles opposite to alternate, linear to subulate, 1–2.5 mm long, 0.4–0.75 mm wide, apex acute, ciliate, moderately densely hairy on the back; pedicel 3–6 mm long, up to 10 mm at fruiting, recurved at fruiting, hairs as for peduncle. Outer sepals elliptic to obovate, 5–6.5 mm long, 3–4.5 mm wide, apex barely acute to rounded with a short recurved apiculum, ciliate, moderately to densely hairy outside, hairs appressed to slightly ascending, 0.2–0.5 mm long; inner sepals orbicular-oblong, 5–6 mm long, 4–4.5 mm wide, apex rounded, with a short recurved apiculum, base slightly cordate, rare ciliate hair at the apex, \pm glabrous. Corolla funnel-shaped, pink, c. 10 mm long, 10–12 mm diameter, flared c. 4–4.5 mm above the base of the tube; petals 9–12 mm long, 7–8 mm wide, with rounded apiculate lobes, glabrous except for appressed hairs on the outside of the midpetaline band for 3–6 mm from the apex. Stamens 5, unequal; filaments affixed to the corolla tube for 2–2.5 mm from the base, free for 3–4 mm, with low scattered tubercles from 1 mm above the base of the corolla and extending for 2.5–3 mm; anthers ovate to oblong, 1.25–1.5 mm long, 0.75–0.8 mm wide, apex obtuse, emarginate, base sagittate, basal lobes to 0.3–0.35 mm long. Ovary ovoid, 1.25 mm long, on a disk 0.3 mm high, glabrous; style c. 4 mm long, with cylindrical, obtuse stigmas, 1.2–1.25 mm long. Capsule globular, 5.5–6 mm long, c. 5.5 mm diameter, glabrous. Seeds 4, $\frac{1}{4}$ -globular to $\frac{1}{4}$ -globular-obovoid, 3.2–3.8 mm long, 2.5–3 mm wide, dark brown, surface finely punctate bearing scattered low, laterally compressed tubercles, wingless (Fig. 6D).

Specimens examined: **New South Wales.** Brooking near Urana, Crouch s.n. (MEL); Berrigan, Apr 1950, Godden s.n. (NSW). **Victoria.** LOWAN MALLEE: Lowan, Oct 1896, Reader s.n. (MEL). MIDLANDS: Terrick Terrick State Park M2, Nov 1985, Beauglehole ACB82670 (MEL). RIVERINA: Barmah Regional Park L52, Jan 1986, Beauglehole ACB83555 (MEL); Waaia via Numurkah, Mar 1959, Cleaves s.n. (MEL). WANNON: Yarrackigarra Swamp Wildlife Reserve C38, Nov 1986, Beauglehole ACB86983 (MEL); Nurcoung Lakes Reserve C41, Nov 1986, Beauglehole ACB86599 (MEL). WIMMERA: West Yanac Wildlife Reserve C3, Sep 1986, Beauglehole ACB83982 (MEL); Lake Marmal Reserve H7, Dec 1985,



Map 5. Distribution of ●. *Convolvulus wimmerensis*. ★. *C. recurvatus* subsp. *recurvatus*. ▲. *C. recurvatus* subsp. *nullarborensis*. ■. *C. tedmoorei*. Del. W. Smith.

Beaglehole ACB82942 (MEL); Mt Jeffcott Flora Reserve, 17 km ENE of Donald PO, Oct 1979, *Beaglehole & Donald History Group* ACB65283 (MEL); Wimmera, *Dallachy* 101 (MEL); Wimmera, in 1892, *Eckert* s.n. (MEL); near Wycheproof, Oct 1917, *Watts* 778, 785, 786 (MEL); near Dimboola, s.d., coll. ign. 23 (MEL).

Distribution and habitat: *C. wimmerensis* has been most commonly recorded from the Wimmera region of Victoria, but its distribution extends along the northern part of the Riverina District and into New South Wales (Map 5). It grows on flat to undulating plains in open *Eucalyptus* woodlands.

Affinities: *C. wimmerensis* resembles *C. angustissimus* in having strongly recurved fruiting pedicels and much divided leaves. It differs in the shape of the lower cauline leaves, in having dense appressed hairs on cauline leaves and stems, and in having a one-sided dichasial inflorescence with commonly 2 flowers. It has a small corolla at the lower end of the size range for *C. angustissimus*. It also resembles *C. eyreanus*, *C. recurvatus*, *C. crispifolius* and *C. clementii* but differs from them in having flowers with longer petals.

Phenology: Flowering and fruiting have been recorded from November to March.

Etymology: The specific epithet refers to the Wimmera District of Victoria where the species occurs.

9. *Convolvulus angustissimus* R.Br., Prod. 482 (1810); *Convolvulus erubescens* var.

angustissimus (R.Br.) Choisy in A.DC., Prod. 9:412 (1845). **Type:** Tasmania, Van Diemens Land near Risdon Cove, in 1804, R. Brown (holo: BM[Bennett 2765]; iso: MEL[MEL689920], MEL[MEL689582]) (see under Notes).

Convolvulus erubescens var. *albus* Guilfoyle, Australian Plants: 117 (1911). **Type:** "Vic." (holo: n.v.).

Convolvulus geniculatus Lehm., Semina in horto botanico Hamburgense 1826 collecta quae pro mutua commutatione offeruntur (1826). **Type:** not cited.

Perennial with trailing and twining stems; stems terete, densely hairy to ± glabrous in younger parts, becoming sparser with age; hairs short, ± appressed, 0.2–0.5 mm long, in older parts becoming erect and spreading and up to 0.8 mm long, the relative abundance of erect and appressed hairs varying among subspecies. Leaves variable in shape and size from base to tip of the stem. Basal leaves petiolate; petiole long, often longer than the blade; blade ovate to oblong, sometimes triangular, or linear, occasionally slightly hastate, 5–35 mm long, 2–15(–20) mm wide, apex acute to rounded-truncate, occasionally emarginate, base tapering to cordate, decurrent, margin entire, undulate, irregularly crenate to shallowly lobed, basal and ascending lobes barely more prominent, moderately hairy to ± glabrous, hairs short, appressed to longer, erect, depending on subspecies. Leaf size and shape of lower cauline leaves very variable depending on subspecies.

Leaves on fertile stems petiolate; petiole 2–20 mm long; blade narrowly ovate to ovate in outline, 10–65 mm long, apex acute to obtuse, mucronulate, occasionally rounded-emarginate, more acute in upper parts, base tapering to cordate, decurrent, hastate to deeply 3–5-lobed from the base, basal lobes linear to obovate, spreading to recurved, to 17 mm long, apex obtuse or 2-toothed, often with a 2-toothed, recurved secondary lobe on the lower margin, ascending lobes linear, up to 30 mm long, 1–8 mm wide, terminal lobe narrow-linear to narrow-oblong, occasionally triangular, 10–60 mm long, 1–8 mm wide, margin entire, rarely undulate to slightly lobed, moderately hairy to \pm glabrous above, sometimes slightly denser below, hairs appressed to crisped-appressed, 0.15–0.35 mm long on some subspecies, mainly ascending to semi-erect, 0.25–0.6 mm long on others. In upper parts, petiole shorter, blade shorter and with narrow acute lobes, often with short, sometimes bifid, basal lobes and a very narrow ascending lobe. Inflorescence solitary, axillary, bracteolate with solitary flowers, very rarely a one-sided dichasium with 2 flowers or with 2 inflorescences per axil; peduncle terete, 4–50 mm long, moderately to sparsely hairy, hairs mainly appressed, occasionally spreading; bracteoles opposite, rarely sub-opposite, linear, subulate to narrowly ovate, 1–4 mm long, 0.2–0.5 mm wide, apex acute, ciliate, moderately hairy to glabrous on the back; pedicel often darker than the peduncle 3–23 mm long, recurved at fruiting, hairs similar to and often denser than on the peduncle. Outer sepals obovate, obovate-oblong, to elliptic, (3.5–)4–6.5 mm long, 2–5 mm wide, apex acute to rounded with a short recurved apiculum, ciliate, more rarely \pm eciliate (in subsp. *fililobus*), moderately hairy to glabrous outside, hairs appressed to spreading, depending on subspecies; inner sepals obovate to obovate-orbicular, more rarely elliptic or oblong, 3.5–6 mm long, 2.5–4.5 mm wide, apex rounded, with a short recurved apiculum, base rounded to truncate, \pm glabrous or with some hairs around the apex and upper spine. Corolla funnel-shaped, pink, with a paler throat, rarely white, 7–20 mm long, 7–20 mm diameter, flared 2.5–6 mm above base of the tube; petals 8–25 mm long, 3–12 mm wide, with rounded to rounded-triangular, erose, often emarginate, barely apiculate lobes, glabrous except for hairs on

the outside of the midpetaline band for 1–9 mm from the apex. Stamens 5, slightly unequal; filaments affixed to the corolla tube for 1.5–3 mm from the base, free for 1.75–5 mm, with low tubercles from 0.75 mm above the base of the corolla and extending for 1–4 mm; anthers oblong to ovate, 0.8–2.75 mm long, 0.5–1 mm wide, apex rounded, emarginate, base sagittate, basal lobes 0.2–0.7 mm long. Ovary ovoid 1–1.8 mm long, on a well developed disk, 0.25–0.6 mm high, glabrous; style 3–10 mm long, with cylindrical to narrowly ovoid, obtuse stigmas, 1–2.5 mm long. Capsule globular to globular-ovoid, 4–8 mm long, 4–7.5 mm diameter, glabrous. Seeds 4, $\frac{1}{4}$ -globular to slightly $\frac{1}{4}$ -globular-obovoid, 2.9–4 mm long, 2.2–3.5 mm wide, dark brown to black, surface finely punctate usually bearing low reticulate \pm continuous ridges, smooth in subsp. *fililobus*, wing not prominent, discontinuous to absent.

Affinities: *C. angustissimus* most closely resembles *C. wimmerensis*. *C. recurvatus* has similar recurved pedicels subtending mature capsules but its pedicels are much shorter than those in *C. angustissimus*, its flowers smaller and its inflorescences often compound.

Notes: Brown (1810) gave no indication of the type locality in Tasmania. He collected specimens of *C. angustissimus* in Tasmania in 1804 and these collections are now represented in the Natural History Museum, London on two herbarium sheets (David Moore, BM, *pers. com.*)

1. Bennett 2767 – One of three labels lists a collecting locality as “Port Dalrymple prope littora Jan: 1804”.
2. Bennett 2765 - Two labels are present on the sheet, one states “In campis prope Baie du Nord quandum Frederick Harvey (Henry) Bay dict Feb: 1804”, the other “Van Diemens Land near Risdon Cove” [Type of *Convolvulus angustissimus* R.Br. according to the sheet].

Based on this I have accepted the designation of the latter collection as the holotype. A further two specimens of this taxon collected by Brown and held at MEL list only “Van Diemens Land” as the collecting locality and I have assumed these are isotypes.

Although the description of *C. geniculatus* Lehm. is a very general one, and no type specimen has been cited, on the basis of its solitary flowers and geniculate pedicels at fruiting, it is highly likely it is conspecific with *C. angustissimus*.

This species shows considerable variation. While the simple inflorescence, relatively large flowers and recurved fruiting pedicels characterize this taxon, other attributes are very variable, particularly its leaf shape and vestiture. Further field work is probably needed for a better understanding of the complex. The specimen collected by Brown from Risdon Cove consists of the plant crown and upper leaves which have much divided narrow basal lobes, narrow ascending lobes and a narrow-linear entire terminal lobe. Leaves in the lower part of the plant are absent. A good match for the type specimen is one collected at Ross (Burns 7). All other specimens borrowed from HO have ovate, oblong or triangular, hastate, lower cauline leaves, becoming much divided up the stem with leaves on terminal branches of older plants with very narrow lobes resembling those on the holotype. Parham (*pers. comm.*) did not find any specimens in HO with narrowly lobed, much divided leaves to the base of the stem. In addition, in visits to both Risdon Cove and Ross, Parham did not find any plants with narrow, deeply divided,

lower cauline leaves.

However in Victorian specimens seen, many have a few linear hastate basal leaves which are abruptly replaced distally by lobed leaves with very narrow linear lobes up to 2 mm in width. These leaves resemble those on the type specimen. The basal leaves absent from the type specimen may have been similar to the broad divided leaves found on other Tasmanian specimens or the very narrow leaves found on the type may have occurred along the stem to the base as occurs in many Victorian specimens. For this revision I have accepted the former possibility. On this basis, all Tasmanian material is of *C. angustissimus* subsp. *angustissimus*.

Both *C. angustissimus* subsp. *omnigracilis* and *C. angustissimus* subsp. *fililobus* are reasonably distinctive but much variation is present within *C. angustissimus* subsp. *angustissimus* and *C. angustissimus* subsp. *peninsularum*. Because of the great variation, resulting from ontogenetic development and geographic distribution, and the influence of time of germination and length of the growing season on morphology, it is difficult to classify the existing variation on the basis of herbarium specimens. In addition, hybridisation further confounds attempts at classification. More field work will be necessary to clarify the variation which exists within these taxa.

Four subspecies are recognised and can be distinguished as follows.

1. Lower cauline leaves broad and much divided with the terminal lobe more than 1.5 mm wide; lobes gradually becoming narrower towards the tip **9a. *C. angustissimus* subsp. *angustissimus***
Cauline leaves with narrow lobes almost from the base of the plant; lobes < 1.5 mm wide, or if wider then basal lobes spreading and clavate and terminal lobe distinctly obovate-clavate. 2
2. Flowers 14–25 mm long; flowering pedicels 8–18 mm long; outer sepals moderately to sparsely hairy, usually ciliate at the tip; seeds with sparse low reticulate ridges. **9b. *C. angustissimus* subsp. *omnigracilis***
Flowers 9–14 mm long; flowering pedicels 4–8 mm long 3
3. Seeds smooth; sepals ± glabrous to sparsely hairy, with hairs mainly appressed, leaves with ascending lobes often > 1/3 the length of the terminal lobe and lacking distinctive basal lobes **9c. *C. angustissimus* subsp. *fililobus***
Seeds with sparse low reticulate ridges; sepals moderately to sparsely hairy with ascending and spreading hairs common; leaves with ascending lobes mostly < 1/3 the length of the terminal lobe; lower cauline leaves with distinct, spreading, clavate basal lobes. **9d. *C. angustissimus* subsp. *peninsularum***

9a. *Convolvulus angustissimus* R. Br. subsp. *angustissimus*

Convolvulus adscendens de Vriese in Lehmann, *Plantae Preissianae* 1: 346 (1845). **Type:** In arenosis apertis distr. York, 16 March 1839, *Herb. Preiss* No. 1924 (holo: LD; iso: MEL[MEL689918, MEL689919]).

Convolvulus subpinnatifidus de Vriese in Lehmann, *Plantae Preissianae* 1: 347 (1845). **Type:** In solo sublimoso fertili prope Beljarup, Hay, 4 November 1840, *Herb. Preiss* No. 1925 (holo: LD; iso: MEL[MEL689916, MEL689917]).

Convolvulus acaulis Choisy in A.DC. *Prodr.* 9:406 (1 Jan 1845). **Type:** Nova Hollandia (ins. Kangaroos) (PARIS). (holo: P).

Stems densely to moderately hairy in younger parts, becoming sparser with age, hairs \pm appressed, 0.2–0.4 mm long, on older parts becoming erect and spreading and up to 0.8 mm long. Leaves variable in shape and size from base to tip of the stem (Fig. 7A). Blade of basal leaves ovate to oblong, sometimes triangular or linear, occasionally slightly hastate, 5–25 mm long, 4–15 mm wide, apex acute to rounded-truncate, occasionally emarginate, base truncate to cordate, decurrent, margin irregularly crenate to serrate to shallowly lobed, basal and ascending lobes barely more prominent, moderately hairy to \pm glabrous, hairs semi-erect, 0.25–0.8 mm long. Leaves on fertile stems petiolate; petiole 2–20 mm long; blade ovate to triangular-ovate in outline, 10–65 mm long, 2–40 mm wide, apex acute, rarely obtuse to rounded-emarginate, more acute in upper parts, base cordate, decurrent, often 3–5 lobed from the base, basal lobes linear to narrowly oblong to 17 mm long, entire or 2-toothed, often with a 2-toothed recurved secondary lobe on the lower margin, ascending lobes linear, up to 30 mm long, 1–8 mm wide, terminal lobe linear to narrow-oblong, often triangular, 10–60 mm long, 1–8 mm wide, entire, rarely undulate to slightly lobed, moderately hairy to \pm glabrous above, slightly denser below, hairs mainly ascending to semi-erect, 0.25–0.6 mm long. In upper parts, petiole shorter, lobes becoming narrower, more acute, sometimes with very short basal and ascending lobes and a long narrow-linear

terminal lobe. Peduncle 5–50 mm long; pedicel 3–23 mm long. Outer sepals obovate to obovate-oblong, more rarely elliptic, 4–6 mm long, 2.5–5 mm wide, ciliate, moderately to sparsely hairy outside, hairs loosely ascending to spreading, some appressed, or more rarely almost all appressed, 0.15–0.5 mm long; inner sepals obovate to obovate-orbicular, rarely elliptic, 4.5–5.7 mm long, 3–4.5 mm wide, \pm glabrous to sparsely hairy outside. Petals 9–21 mm long, 5–12 mm wide. Capsule globular to globular-ovoid, 4–8 mm long, 4–7 mm diameter. Seeds 2.9–4 mm long, 2.2–3.5 mm wide bearing low reticulate \pm continuous ridges (Fig. 8A).

Selected specimens (230 specimens examined): **Western Australia.** King Georges Sound, s.d., *Muir* s.n. (MEL689547); Harvey, Nov 1916, *Stoward* s.n. (PERTH). **South Australia.** Big Heath NP, S portion, c. 7 km SE of Nine Mile Well, Nov 1969, *Jackson* 1605 (AD); Mt Lofty Ridge Wildlife Reserve, Feb 1969, *Sexton* s.n. (AD); Lenswood Agricultural Research Centre, north east, Nov 1978, *Spooner* 6205 (AD); near summit of Mt Barker, c. 30 km SE of Adelaide, Dec 1964, *Whibley* 1526 (AD); c. 20 km SE of Mt Gambier, *Wilson* 799 (AD). **Queensland.** BURNETT DISTRICT: Narayen, Mar 1973, *coll. ign.* N1334 (BRI). MARANO DISTRICT: Stanhope Downs, 44 km by road NW of Roma, Nov 1996, *Thomas* s.n. (BRI). DARLING DOWNS DISTRICT: Kildonan, Feb 1936, *Blake* 10528 (BRI). **New South Wales.** Molong, Nov 1906, *Boorman* s.n. (NSW); NSW-ACT border adjoining Queanbeyan rubbish tip, Jan 1983, *Coveny & Hind* 11502 (BRI, NSW); 12 miles NE of Albury on Hume Highway, Oct 1967, *Muir* 4605 (MEL); Sinclair Lookout, 14.4 km W of Glen Innis, Mar 1987, *Plat, Coveny & Dunn* 7 (BRI); SE of Nimmitabel, Nov 1960, *Salasoo* 1980 (NSW); Armidale, UNE hill, Nov 1959, *Winterhalder* s.n. (NE). **Victoria.** MIDLANDS: 7 miles SW of Thoona, Nov 1960, *Muir* 1756 (MEL). RIVERINA: Farran's Lookout on Murray Valley Highway, 3 miles N of Towong, Oct 1961, *Muir* 2395 (MEL). VICTORIAN VOLCANIC PLAIN: Warrnook road, c. 14 km SSW of Chetwynd, Nov 1982, *Corrick* 8472 (BRI, MEL). WANNON: Portland, Gorae West, 1946, *Beaulehole* 38437 (MEL). **Tasmania.** Poatina, Nov 1986, *Buchanan* 8854 (HO); Domain, Hobart, Oct 1942, *Curtis* s.n. (HO); Cape Portland, Oct 1983, *Moscal* s.n. (HO); Township Lagoon, Nov 1983, *Moscal* 3894 (HO, MEL).

Distribution and habitat: *C. angustissimus* subsp. *angustissimus* has been recorded from all States but not from the Northern Territory (Map 6). It occurs in Tasmania mainly in the Hobart–Launceston area with no records from the western part of the State. It is widespread in Victoria but is absent from the north-west and east coast. It extends into the south-east of South Australia with other populations in the

Adelaide area and on the Yorke and Eyre Peninsulas. In Western Australia, it is restricted to the south-western corner. In eastern Australia, it extends northwards through the tableland areas of New South Wales into southern Queensland, where it is found mainly west of the Great Dividing Range as far north as Springsure. It is found on level to hilly terrain in mainly loamy and clay soils, less commonly in sandy and rocky soils. It grows in grassy eucalypt woodlands and forests and in grasslands which develop following the clearing of the woodlands.

Phenology: Flowering occurs mainly in early spring to mid autumn (September–April) while fruiting occurs from late spring to late autumn (November–May).

Notes: As circumscribed here, considerable variation exists within this subspecies. The typical form with large flowers and long pedicels is found in Tasmania and southern Victoria and extends into south-eastern South Australia and north into New South Wales. Similar forms are found at Narayan, Queensland (AQ 637866), at Armidale in northern New South Wales and at the Wombeyan Cave (*Constable* NSW56058). In the Kosciusko region of New South Wales and nearby areas of Victoria, specimens (e.g. *Muir* 2395, *Makinson* 975, *Walsh* 279, *Forbes* 576) have denser erect hairs. However similar vestiture is also found on occasional specimens throughout the range of this subspecies. In drier parts of Victoria on through South Australia to Western Australia there is a gradual reduction in the size of the corolla with petals on most specimens rarely exceeding 14 mm in length.

In Queensland, a variant with moderately dense ascending to erect hairs up to 0.75 mm long is found in the Charleville district (*Clements* AQ275818, *Bailey* AQ275821). This variant has black seeds, 4.5–5 mm long, which are larger than those from other populations. In addition the surface ridges on the seeds are more distinctly raised and the discontinuous wing more prominent. Both are formed by fused hair-like structures. No collections have been made of this population since 1945 and the study of further material may warrant its recognition as a distinct taxon.

9b. *Convolvulus angustissimus* subsp. *omnigracilis* R.W. Johnson, subsp. nov.
affinis *C. angustissimo* R. Br. subsp. *angustissimo* sed foliis valde anguste lobatis fere basi differt. **Typus:** Victoria. VICTORIAN VOLCANIC PLAIN: Nerrin–Nerrin - Woorndoo road, 4 km WSW of Mt Hamilton, near Pagel's Lane (37°48'S 142°56'30"E), 27 November 1983, *S.J. Forbes & N. Scarlett* 1867 (holo:MEL [MEL67409]; iso: BRI [AQ420954]).

Stems moderately densely to sparsely hairy, becoming sparser with age, hairs \pm appressed, occasionally spreading, 0.15–0.4 mm long. Leaves are somewhat variable in shape and size from base to tip of the stem though lobes are narrowly linear throughout (Fig. 7B). Blade of basal leaves linear, linear-elliptic to narrow oblong, hastate, 5–35 mm long, 2–10 mm wide, apex obtuse to rounded, rarely emarginate, base tapering to truncate, margin entire to slightly undulate but soon with narrow bifid basal lobes, well developed ascending and terminal lobes, sparsely hairy to \pm glabrous, rarely moderately hairy, hairs \pm appressed, 0.15–0.4 mm long. Leaves on fertile stems petiolate; petiole short, 3.5–15 mm long; blade linear to ovate in outline, 12–60 mm long, apex acute to almost obtuse, base tapering to cordate, hastate to deeply lobed, basal lobes linear, often short, 0.5–5 mm long, occasionally to 12 mm long, sometimes with a recurved secondary lobe from the lower margin, ascending lobes linear to 25 mm long, < 1 mm wide, terminal lobe linear or obovate-linear 12–60 mm long, < 2 mm wide, \pm glabrous to sparsely hairy, hairs appressed, 0.15–0.35 mm long, margin entire. In upper parts, leaves smaller but of similar shape. Peduncle 5–35 mm long; pedicel 5–18 mm long. Outer sepals obovate to elliptic, 4.5–6 mm long, 2.8–3.7 mm wide, apex acute to rounded with a shortly recurved apiculum, ciliate, moderately to sparsely hairy outside, hairs appressed, 0.1–0.3 mm long; inner sepals obovate, 4.8–6 mm long, 3–4 mm wide, \pm glabrous to sparsely hairy outside. Petals 14–25 mm long, 8–12 mm wide. Capsule globular, 5–8 mm long, 4.5–7 mm diameter. Seeds 3.5–4 mm long, 2.7–3.3 mm wide bearing low reticulate \pm continuous ridges (Fig. 8B).

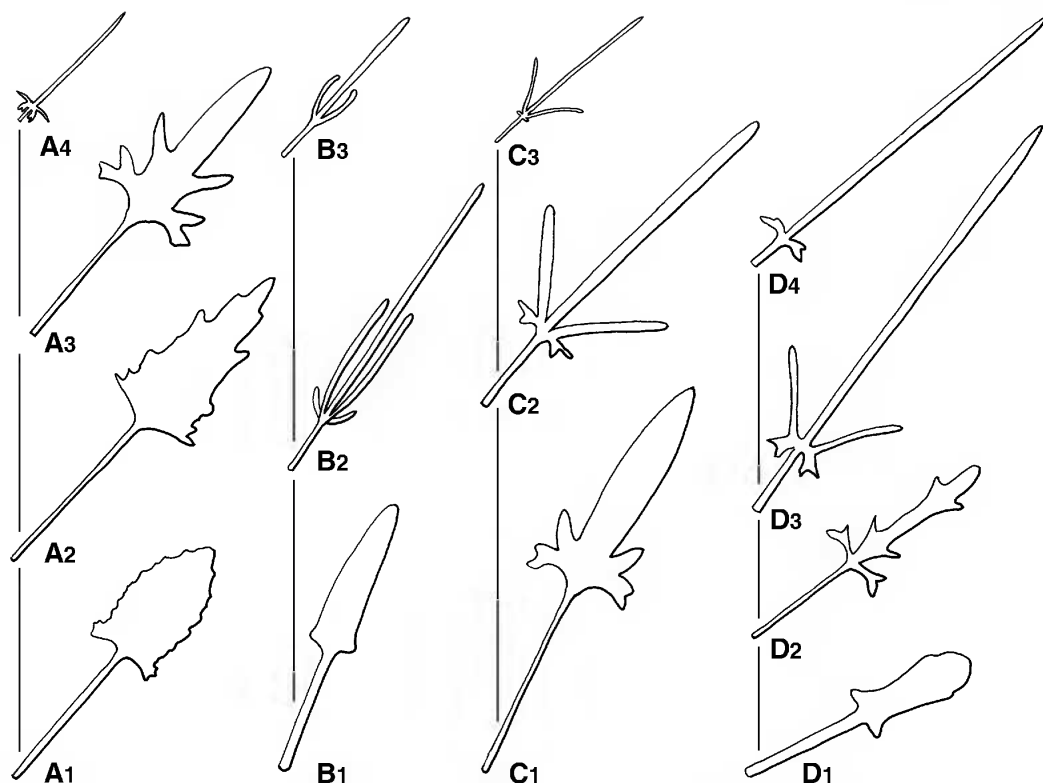


Fig. 7. Variation in leaf shape of *Convolvulus* species from base to tip of stems. A. *C. angustissimus* subsp. *angustissimus*. (1) Moscal 3894 (HO) \times 1, (2) coll. ign. s.n. (HO36311) \times 1, (3) Rodway s.n. (HO15256) \times 1, (4) Tate s.n. (AD97605515) \times 2; B. *C. angustissimus* subsp. *omnigracilis*. (1) Stones s.n. (MEL503463) \times 2, (2) Baker s.n. (MEL536246) \times 1, (3) Forbes 1867 & Scarlett (MEL) \times 2; C. *C. angustissimus* subsp. *fililobus* \times 2. (1) Beaglehole ACB87768 (MEL), (2) Aston 2367 (MEL), (3) Beaglehole ACB66176 (MEL); D. *C. angustissimus* subsp. *peninsularum*. (1) Eichler 14063 (AD) \times 2, (2) Eichler 14063 (AD) \times 1, (3) Alcock 654E (AD) \times 2, (4) Alcock 654B (AD) \times 1. Del. W. Smith.

Selected specimens (36 specimens examined):

Victoria. EAST GIPPSLAND: Amboyne Creek Area, 11 km NW of Tubbut PO, Jan 1980, *Beaglehole* ACB67710 (MEL). EASTERN HIGHLANDS: Whittlesea, Mar 1904, *Baker* s.n. (MEL 536248). MIDLANDS: 15 km W of Maryborough PO, N of abandoned goldmine J7, Nov 1979, *Beaglehole & Maryborough FNC* ACB66592 (MEL); 8.2 km SE of Ararat, Jan 1995, *Zich & Young* 258 (CANB). OTWAY PLAINS: Limeburners Lagoon Flora & Fauna Reserve P3, Mar 1982, *Beaglehole & Errey* ACB70341 (MEL). VICTORIAN VOLCANIC PLAIN: Corio, Geelong Area, Feb 1964, *Anderson* s.n. (MEL 503341); Laverton, 13 miles WSW of Melbourne, 0.5 miles NE of Laverton, Nov 1962, *Aston* 847 (MEL); Broadmeadows & Glenroy, Oct 1903, *Baker* s.n. (MEL 536247); Campbellfield, Broadmeadows, Nov 1900, *Baker* s.n. (MEL 536250); Preston, Nov 1899, *Baker* s.n. (MEL 536249); Deer Park, Sep 1900, *Baker* s.n. (MEL 536246); Werribee, Dec 1899, *Baker* s.n. (MEL 536255); Keilor, n.d., *Cowle* s.n. (MEL 579995; MEL 689658); Nerrin-Nerrin Woorndoo road, 4 km WSW of Mt Hamilton, Nov 1983, *Forbes & Scarlett* 1867 (MEL); Williamstown Butts, Dec 1953, *Hansen* s.n. (MEL 689793); Camperdown-Foxhow road, 25 km

WSW of Cressy PO, Oct 1977, *Hirth* s.n. (MEL 1513254); Campbellfield, Melbourne, Oct 1978, *Muir* 6277 (MEL); Lake Corangamite, SW of Cundare, Oct 1982, *Scarlett* s.n. (BRI [AQ377773]); Rifle Range, Williamstown, Dec 1943, *Smith* 43/104 (MEL); Altona, Oct 1975, *Stones* s.n. (MEL 503463); St Albans Railway, Oct 1975, *Stones* s.n. (MEL 503472).

Distribution and habitat: *C. angustissimus* subsp. *omnigracilis* is restricted to Victoria being found around Melbourne and extending to the west and north-west to near Ararat and St Arnaud (Map 7). It grows mainly in grassy communities on plains on grey to yellow clay loam or clay soils. These soils are commonly derived from basalt or Ordovician shales. Populations also occur around Lake Corangamite, sometimes on *Coxiella* shell deposits.

Phenology: Flowering occurs mainly in mid

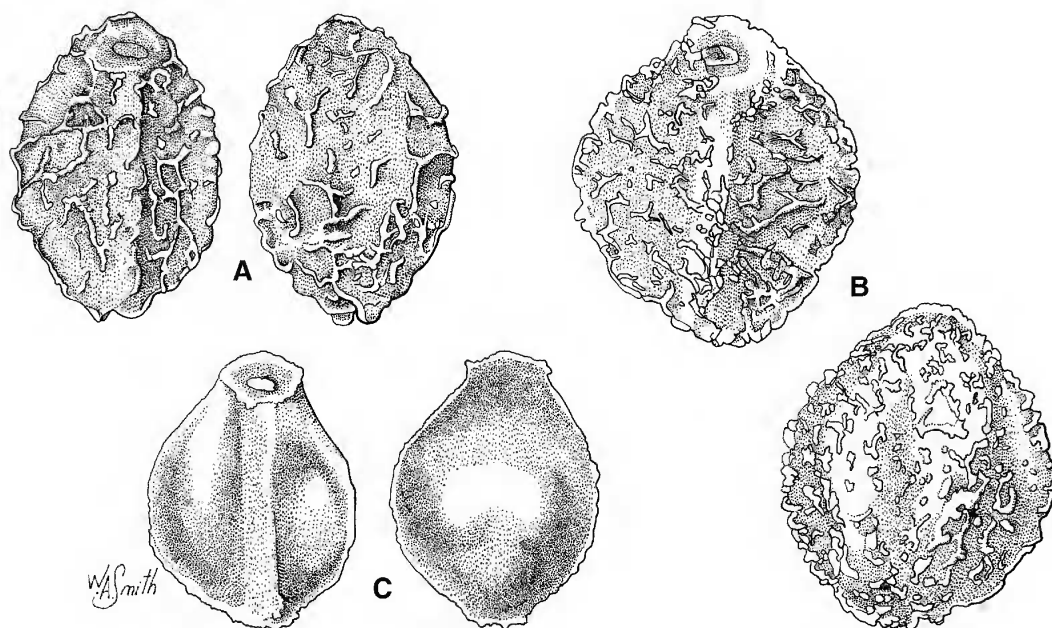
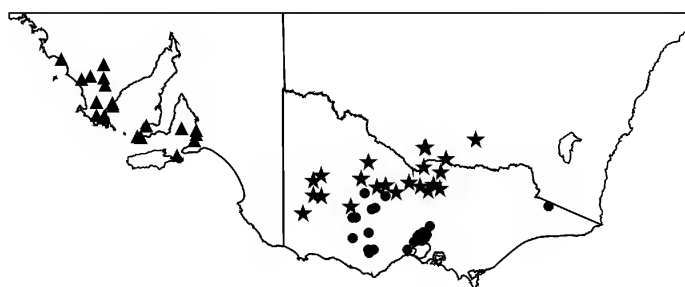


Fig. 8. Seeds of *Convolvulus angustissimus*, adaxial (L.H.S.) and abaxial (R.H.S.) surfaces $\times 10$. A. *C. angustissimus* subsp. *angustissimus* from Hosking 661 (NSW); B. *C. angustissimus* subsp. *omnigracilis* from Smith 43/104 (MEL); C. *C. angustissimus* subsp. *fililobus* from Aston 2367 (MEL); NB. Seeds of *C. angustissimus* subsp. *peninsularum* not available. Del. W. Smith.



Map 7. Distribution of ●. *Convolvulus angustissimus* subsp. *omnigracilis*. ★. *C. angustissimus* subsp. *fililobus*. ▲. *C. angustissimus* subsp. *peninsularum*. Del. W. Smith.

spring to early summer (October–December) with some flowering throughout late summer and autumn. Fruits are produced throughout the spring to autumn period.

Etymology: The subspecific epithet refers to the lobes of the much divided leaves of this subspecies which are slender in all leaves on the plant.

9c. *Convolvulus angustissimus* subsp. *fililobus* (Wawra) R.W. Johnson, **comb. nov. *Convolvulus erubescens* var. *fililobus* Wawra, *Itinera Principum* S. Coburgi 1: 102 (1883). **Type:** Victoria. Prarien des Murraygebietes (holo: W).**

Stems mainly trailing, moderately to sparsely hairy, becoming sparser with age, hairs short appressed, 0.15–0.3(–0.5) mm long. Blade of basal leaves linear, linear-elliptic to narrowly oblong, hastate, 5–20 mm long, 5–8 mm wide, apex obtuse to rounded, mucronulate, base tapering to truncate, margin undulate, often toothed or lobed towards the base, sparsely hairy to \pm glabrous, hairs appressed, 0.1–0.4 mm long, but soon becoming deeply and narrowly 5-lobed. Leaves on fertile stems petiolate; petiole short 2.5–8 mm long; blade ovate in outline, 15–40 mm long, apex acute to almost obtuse, base tapering to shallowly cordate, deeply 5-lobed, basal lobes linear, 1–7(–10) mm long, sometimes with a recurved secondary lobe from the basal margin, ascending lobes narrowly linear to 20 mm long, < 1 mm wide, terminal lobe narrowly linear, 15–40 mm long, < 1.5 mm, entire, moderately to very sparsely hairy, hairs appressed, 0.1–0.3 mm long. In upper parts, leaves smaller, often with prominent terminal lobe and short but distinct narrowly linear basal and ascending lobes (Fig. 7C). Peduncle 4–13(–20) mm long; pedicel 4–8 mm long, occasionally extending to 12 mm at fruiting. Outer sepals obovate to elliptic, 3.5–5(–5.5) mm long, 2.4–3.5 mm wide, eciliate or with a few scattered cilia, sparsely hairy to \pm glabrous, very rarely moderately hairy outside, hairs mainly appressed, 0.15–0.25 mm long. Inner sepals obovate to oblong, 3.5–5(–5.5) mm long, 2.7–3.8 mm wide, glabrous. Petals 9–14 mm long, 5–9 mm wide. Capsule globular, 6–6.5 mm long, c. 5.5 mm diameter. Seeds 3–4 mm long, 2.2–2.6 mm wide, golden brown with darker mottling,

surface finely punctate without any protuberances, scurfy with a distinct ridge on the outer margins, occasionally with a very narrow discontinuous wing of fused hair-like structures (Fig. 8C).

Specimens examined: **New South Wales.** 13 km E of Urana, on Urana to Lockhart road, Nov 1982, *Aston* 2367 (MEL, BRI); Falkiner Memorial Field Station, Deniliquin, Nov 1975, *Crisp* 1813 (CBG); Falkiner Memorial Field Station, Deniliquin, Dec 1945, *Willoughby* 77 (CANB). **Victoria.** GRAMPPIANS: Mt Arapiles SW side, c. 0.75 miles W of Natimuk Golf Course, Nov 1968, *Beaughtole* ACB29738 (MEL); Mitre Rock, 10 km W of Natimuk PO, Nov 1979, *Beaughtole* ACB66176 (MEL); Grampians, 6.4 km from Stawell on road to Halls Gap, Nov 1959, *Symon* 86 (NE). RIVERINA: Gaynor Swamp Wildlife Reserve, Apr 1981, *Beaughtole* ACB68838 (MEL); Spence Bridge Education Area L38, Sep 1985, *Beaughtole* ACB80211 (MEL); Tocumwal Regional Park, Sep 1985, *Beaughtole* ACB81273 (MEL); Barmah State Park L53, Nov 1985, *Beaughtole* ACB82215 (MEL); Barmah State Forest L52, Nov 1985, *Beaughtole* ACB82460 (MEL); Murray River Reserve G36, Dec 1985, *Beaughtole* ACB83322 (MEL); Hunter, 11 km NW of Elmore, Nov 1989, *Davies & Hadlow* 1334 (CBG); Tatura, Nov 1945, *Gauba* s.n. (CBG 12623); 13 miles S Shepparton on Goulburn Valley Highway, Oct 1967, *Muir* 4632 (MEL); Rushworth-Murchison Road, 6 km ESE of Rushworth M34, Dec 1981, *Muir* 7000 (MEL); c. 1 km S of Wunghnu between Goulburn Valley Highway and railway line, Nov 1981, *Stebbing* s.n. (MEL 642833). WANNON: Mooree Historic Reserve C19, Nov 1986, *Beaughtole* ACB87426 (MEL); Kialla Roadside Reserve, Dec 1986, *Beaughtole* ACB87649 (MEL); Tarranjurk Roadside Reserve C17, Dec 1986, *Beaughtole* ACB87768 (MEL). WIMMERA: Jeffcott Roadside Reserve, Dec 1986, *Beaughtole* ACB87967 (MEL); 9 miles from Quambatook towards Dumosa, Oct 1963, *Phillips* 17 (CBG).

Distribution and habitat: *C. angustissimus* subsp. *fililobus* is found in an arc from central western Victoria, west of Horsham, through the Riverina District of Victoria and extending into New South Wales in the southern part of the south western plains in the Urana–Deniliquin area (Map 7). It grows on clay and clay loam soils on plains.

Phenology: Flowering occurs mainly in early spring to early summer (September – December) while fruit are produced throughout spring to early autumn.

Etymology: The subspecific epithet refers to the finely divided leaves characteristic of plants of this subspecies.

9d. *Convolvulus angustissimus* subsp. *peninsularum* R.W. Johnson, subsp. nov. affinis *C. angustissimo* R. Br. subsp. *angustissimo* sed foliis anguste lobatis e basi et foliis humilibus lobis basalibus distincte effusis obovatis differt. **Typus:** South Australia. YORKE PENINSULA REGION: Innis National Park, 3 km S of northern boundary (35°15'S 136°55'E), 9 October 1974, C.R. Alcock 4733 (holo: AD[AD97523049]; iso: SYD, n.v.).

Stems moderately hairy to \pm glabrous, glabrescent, hairs appressed to crisped-appressed, 0.2–0.4 mm long though towards the base, hairs more spreading and longer. Leaves variable in shape and size from base to tip of the stem (Fig. 7D). Blade of basal leaves oblong hastate, 5–10 mm long, 3–8 mm wide, apex obtuse to rounded, base cordate, margin undulate, sparsely to moderately hairy, hairs spreading, 0.25–0.5 mm long, blades soon becoming longer and narrower with distinct, spreading, entire, 2-toothed or bi-lobed basal lobes and a narrow-linear to linear obovate terminal lobe up to 25 mm long, rarely more than 4 mm wide with an undulate to distinctly lobed margin, hairs becoming more appressed. Leaves on fertile stems petiolate; petiole 3–12 mm long; blade narrow-linear or narrowly ovate in outline, 15–35 mm long, apex obtuse, mucronulate, base cordate, sometimes truncate, basal pair of lobes linear to obovate, lateral to recurved, up to 7 mm long, apex obtuse, toothed, often with a recurved secondary lobe from the lower margin, ascending lobes linear, up to 10 mm long, terminal lobe linear to linear-obovate, 15–35 mm long, up to 5 mm wide, margin entire or slightly undulate, moderately hairy to \pm glabrous, hairs spreading to appressed, 0.2–0.5 mm long. In upper parts, leaves linear, hastate, often with short basal lobes, sometimes bifid, sometimes with ascending lobes, and a very narrow terminal lobe. Peduncle 4–20(–35) mm long; pedicel 3–8 mm long. Outer sepals oblong, obovate-oblong, rarely elliptic, 4–5.5 mm long, 2–4 mm wide, apex rounded apiculate, ciliate, moderately dense to sparsely hairy outside, hairs appressed, ascending to spreading, 0.2–0.5 mm long; inner sepals obovate-oblong to elliptic, 4–5.5 mm long, 2.5–3.5 mm wide, moderately hairy to glabrous. Petals 8–13 mm long, 3–10 mm wide. Capsule globular 5–6 mm

long, c. 5 mm diameter. Seeds 3.2–3.3 mm long, c. 2.5 mm wide, surface finely punctate bearing low reticulate ridges.

Selected specimens (28 specimens examined): South Australia. nr Yallunda Flat, midway between Tumby Bay and Cummins, Oct 1964, *Alcock* 654A (AD); [Port] Lincoln, Northshore, Nov 1964, *Alcock* 654B (AD); Coontra Creek, Lincoln Highway, Nov 1964, *Alcock* 654C (AD); near Lipson, Lincoln Highway, 10 km N of Tumby Bay, Dec 1964, *Alcock* 654E (AD); near Boston House, 3 km N of Port Lincoln, Jan 1965, *Alcock* 654L (AD); Lincoln Highway, 3 km N of Port Lincoln, Oct 1964, *Alcock* s.n. (AD); Hundred of Blessing, E End Camp, S of Bascombe Well, Oct 1967, *Alcock* 1481 (AD); Hincks NP, N-S track, Hundred of Nicholls, Oct 1968, *Alcock* 2365 (AD); Innis NP, 3 km S of N boundary, Oct 1974, *Alcock* 4733 (AD); Coontra Creek, near Tumby Bay, Jan 1965, *Alcock* 654 (AD); Pondalow Bay, c. 10 km NW of Stenhouse Bay, Oct 1965, *Blaylock* 43 (AD); Port Lincoln, in 1875, *Browne* s.n. (MEL); sea coast, c. 4 km S of Corny Point, Sep 1957, *Eichler* 14063 (AD); Hallett Cove, c. 20 km SSW of Adelaide, Mar 1937, *Ising* s.n. (AD); Sellicks Beach scrub, Nov 1968, *Kraehenbuehl* 2657, 2670 (AD); Hallett Cove Conservation Park, Dec 1978, [*Launer*] 9 (AD); Hundred of Noarlunga Sec. 190, Nov 1966, *Parsons* 200 (AD); Hog Bay E end, Kangaroo Island, Nov 1883, *Tate* s.n. (AD); Venus Bay, s.d., *Warburton*. s.n. (MEL); Hundred of Blessing, c. 10 km SW of Bascombes Well, Oct 1967, *Wheeler* 662 (AD).

Distribution and habitat: *C. angustissimus* subsp. *peninsularum* is found on the Eyre and Yorke peninsulas in South Australia and on Kangaroo Island (Map 7). It is found on seashores and coastal cliffs but also extends inland, occurring mainly in heathlands and grasslands.

Phenology: Flowers are found in late spring and throughout summer with fruits being produced soon after flowering.

Notes: This subspecies includes very distinctive variants which occur in coastal areas mainly in the southern parts of the Yorke and Eyre Peninsulas. It is characterised by spreading basal lobes on the lower leaves. It becomes difficult from incomplete herbarium specimens to distinguish this subspecies from smaller flowered forms of *C. angustissimus* subsp. *angustissimus* which occur to the north of it. Further field work will be needed to understand better the relative distributions of these subspecies. Few seeds of *C. angustissimus* subsp. *peninsularum* were available for study and further information on seed size and sculpture is needed to assess their relevance.

Etymology: The specific epithet refers to the known distribution of this subspecies which is found mainly on the Yorke and Eyre peninsulas in South Australia.

10. *Convolvulus recurvatus* R.W. Johnson, sp. nov. affinis *C. clementio* Domin sed pedicellis ad fructificans brevioribus et recurvis differt. **Typus:** South Australia. Bute District, c. 140 km NNW of Adelaide, 28 October 1966, B. Copley 827 (holo: AD; iso: K, n.v.).

Perennial with trailing and twining stems; stems terete, moderately hairy, becoming sparser with age, hairs appressed to ascending and spreading, 0.2–0.8 mm long. Leaves variable in shape and size from base to tip of the stem. Basal leaves petiolate; petiole long, often longer than the blade, 5–20 mm long; blade linear to oblong, sometimes triangular, 6–20 mm long, 4–15 mm wide, apex obtuse to rounded, mucronulate, sometimes emarginate, base truncate to cordate, sometimes hastate, margin \pm entire, undulate to irregularly crenate or lobed, soon becoming 3–5-lobed with lobes having lobed to entire margins, \pm glabrous, soon becoming moderately hairy, hairs loosely appressed to spreading 0.15–0.6 mm long. Leaves subtending inflorescences petiolate; petiole 2–20 mm long; blade ovate in outline, usually divided almost to the base into 3–5 lobes, 7–35 mm long, 5–20 mm wide, apex bluntly obtuse to truncate, mucronulate, sometimes emarginate, base cordate, decurrent, basal pair of lobes linear to narrowly oblong, 1–12 mm long, often 2–3-toothed with a secondary recurved lobe from the lower margin, ascending lobes linear to narrowly obovate contracted towards the base up to 20 mm long, 1–4 mm wide, often more than half the length of the terminal lobe, terminal lobe linear to narrowly obovate or oblong, contracted towards the base, 5–25 mm long, 1.5–6(–10) mm wide, margin undulate to irregularly crenate, more rarely entire, sometimes shallowly lobed, sparsely to moderately hairy, hairs appressed, crisped-appressed to spreading, 0.1–0.5 mm long. In upper parts, leaves with shorter petioles, lobes becoming narrower and, except for the basal lobes, always entire. Inflorescence, solitary, axillary, bracteolate, a one-sided dichasium with 1 or 2 flowers, or occasionally

with 2 inflorescences per axil; peduncle terete, 5–25 mm long, moderately to sparsely hairy, hairs appressed to spreading, 0.1–0.6 mm long; bracteoles opposite, occasionally alternate, linear, 0.8–2.5 mm long, 0.25–0.6 mm wide, apex acute, ciliate, sparsely to moderately hairy on the back; pedicel 2–6(–8) mm long, recurved at fruiting, hairs denser and more appressed than on the peduncle. Outer sepals obovate, obovate-oblong to broadly elliptic, 3–5 mm long, 2.5–3.5 mm wide, apex acute to rounded with a short recurved apiculum, ciliate, moderately to densely hairy outside, hairs short appressed, ascending or erect, 0.1–0.6 mm long; inner sepals orbicular to obovate-orbicular or obovate-elliptic, 3–6 mm long, 2–4.5 mm wide, apex obtuse to rounded or slightly emarginate, with a short recurved apiculum, face glabrous or with a few hairs around the apex and down the spine. Corolla funnel-shaped, white or pink, 5–8 mm long, 6–8 mm diameter, flared 2–4 mm above the base of the tube, petals 5–9 mm long, 2.5–6 mm wide, with rounded-triangular to rounded-oblong, emarginate to apiculate lobes, glabrous except for hairs on the midpetaline band for 1.5–3.5 mm from the apex. Stamens 5, unequal, filaments affixed to the corolla tube for 1–2.3 mm from the base, free for 1.2–3 mm, with low scattered tubercles from 0.5 mm above the base of the corolla and extending for 1–1.5 mm; anthers ovate-oblong to oblong-elliptic, 0.5–1 mm long, 0.35–0.7 mm wide, apex rounded, emarginate, often apiculate, base sagittate, basal lobes 0.15–0.25 mm long. Ovary ovoid, 1–1.5 mm long, on a disk 0.25 mm high, glabrous; style 1.5–2.0 mm long, with cylindrical to narrowly ovoid, obtuse stigmas, 0.6–2 mm long. Capsule globular, 4–5 mm long, 4–5.5 mm diameter, glabrous. Seeds 4, $\frac{1}{4}$ -globular, 2.5–3.5 mm long, 2–2.5 mm wide, dark brown, surface finely punctate bearing numerous laterally compressed, wavy tubercles and an irregular, narrow discontinuous wing of fused hair-like structures (Fig. 10A&B).

Affinities: *C. recurvatus* most closely resembles *C. clementii* in the small size of its corolla, its much divided leaves and compound inflorescence. However, it is readily distinguished from that species by its short and strongly recurved pedicels subtending the mature capsules. The cauline leaves of

C. recurvatus also tend to be smaller and more finely divided.

Etymology: The specific epithet was chosen to highlight the characteristic recurved pedicels which support mature capsules.

Two subspecies are recognised and can be distinguished as follows

Hairs on stems and leaves mainly ascending or spreading;

petals 7–9 mm long; outer sepals 4–5 mm long **10a. *C. recurvatus* subsp. *recurvatus***

Hairs on stems and leaves mainly appressed;

petals 5–7 mm long; outer to 4 mm long **10b. *C. recurvatus* subsp. *nullarborensis***

10a. *Convolvulus recurvatus* R.W. Johnson subsp. *recurvatus*

Perennial with trailing and twining stems, with \pm appressed hairs especially towards the tip, but also with many spreading, 0.2–0.8 mm long. Leaves subtending inflorescences petiolate; petiole 2–20 mm long; blade 10–35 mm long, 5–20 mm wide (Fig. 9A). Inflorescence with 1–2 flowers. Pedicel 2–6 (–8) mm long. Outer sepals obovate, 4–5 mm long, 2.5–3.5 mm wide, moderately to densely hairy outside, hairs mainly erect or ascending, 0.25–0.6 mm long; inner sepals 3.5–5 mm long, 3.0–4.5 mm wide. Corolla 6–8 mm long; petals 7–9 mm long, 3–4 mm wide. Stamens affixed to the corolla tube for 1.5–2.3 mm from the base, free for 2–3 mm; anthers 0.8–1.0 mm long, 0.65–0.7 mm wide, basal lobes 0.2–0.25 mm long. Style 2.5–3.0 mm long; stigmatic lobes 1.0–2.0 mm long.

Specimens examined: **South Australia.** Siam Station, c. 100 km W of Pt Augusta, Apr 1921, *Black* s.n. (AD 97524062); between Pt Wakefield & Kilpara, c. 12 km NW of Port Wakefield, Sep 1967, *Blaycock* 606 (AD); Wangianna, 40 km W Marree on railway, Apr 1941, *Cleland* s.n. (AD 97218292); Mt Lyndhurst Station, c. 45 km N of Leigh Creek, May 1924, *Cleland* s.n. (AD 97217274); Curnamona, c. 110 km N of Yunta, Dec 1930, *Cleland* s.n. (AD 97218289); Bute District, c. 140 km NNW of Adelaide, Oct 1966, *Copley* 827 (AD); gate, 3 km E of Ediacara, c. 50 km W of Leigh Creek, Sep 1963, *Lothian* 2422 (AD). **New South Wales.** Near Fowlers Gap, Sep 1952, *Anon* (NE 21249); Fowlers Gap Station, 110 km N from Broken Hill, Dec 1988, *Browne* 557 (LTB); Bogan Gate, Apr 1924, *Ising* 2156 (NSW); 16 miles S of Cobar on Nymagee road, Sep 1966, *Moore* 4488 (CANB); Nucha Lake, 30 km E of Fowlers Gap, Jun 1979, *Pajmans* 3331 (CANB); Trangie, May 1965, *Robards* TR2 (NSW). **Victoria.** MURRAY MALLEE: Red Cliffs, S of Mildura, Sep 1964, *Beaglehole* ACB38486 (MEL); Wyperfeld NP, c. 0.5 miles SW of Wonga Hut, Sep 1968, *Beaglehole* ACB28484 (MEL); between Lakes Mournpoull and Kondarin, 9.7 km NE of Hattah, Aug 1977, *Cameron* 8683 (MEL). LOWAN MALLEE: Wyperfeld NP, Callitris Plain N boundary, Oct 1968, *Beaglehole & Finck* ACB29216 (MEL).

Distribution and habitat: *C. recurvatus* subsp. *recurvatus* is found south of about 30°S from north of Leigh Creek in South Australia in the west to Trangie in New South Wales in the east. It extends south into far north-western Victoria and southern South Australia to the west of Port Augusta (Map 5). Its distribution partly overlaps the south-eastern part of the range of *C. clementii*. It grows on red brown earths and sandy and loamy soils generally in low-lying areas such as flood plains and dry lake bottoms. It has been recorded from *Eucalyptus* woodlands and mallee communities.

Phenology: Flowering occurs throughout the year but mainly in late winter to early spring (August–October); fruit have been recorded mainly from early autumn to late spring (March–November).

Notes: The specimens collected in the Wyperfeld National Park area in Victoria cited above are immature and further collections from the area will be necessary to confirm their identity.

10b. *Convolvulus recurvatus* subsp. *nullarborensis* R.W. Johnson, subsp. nov. affinis *C. recurvatus* R.W. Johnson subsp. *recurvatus* sed corollis et sepalis parvioribus et pilis plerumque adpressis et brevioribus differt. **Typus:** South Australia. NULLARBOR REGION: c. 1 km NW of Cook, 16 September 1960, *P. Wilson* 1692 (holo: AD, iso: BRI, MEL).

Perennial with mainly trailing, more rarely twining stems, with appressed hairs 0.2–0.4 mm long with an occasional longer spreading hair. Leaves subtending inflorescences petiolate; petiole 2–10 mm long; blade 7–25 mm long, 6–20 mm wide (Fig. 9B). Inflorescence commonly 1-flowered, more rarely with 2 flowers. Pedicel

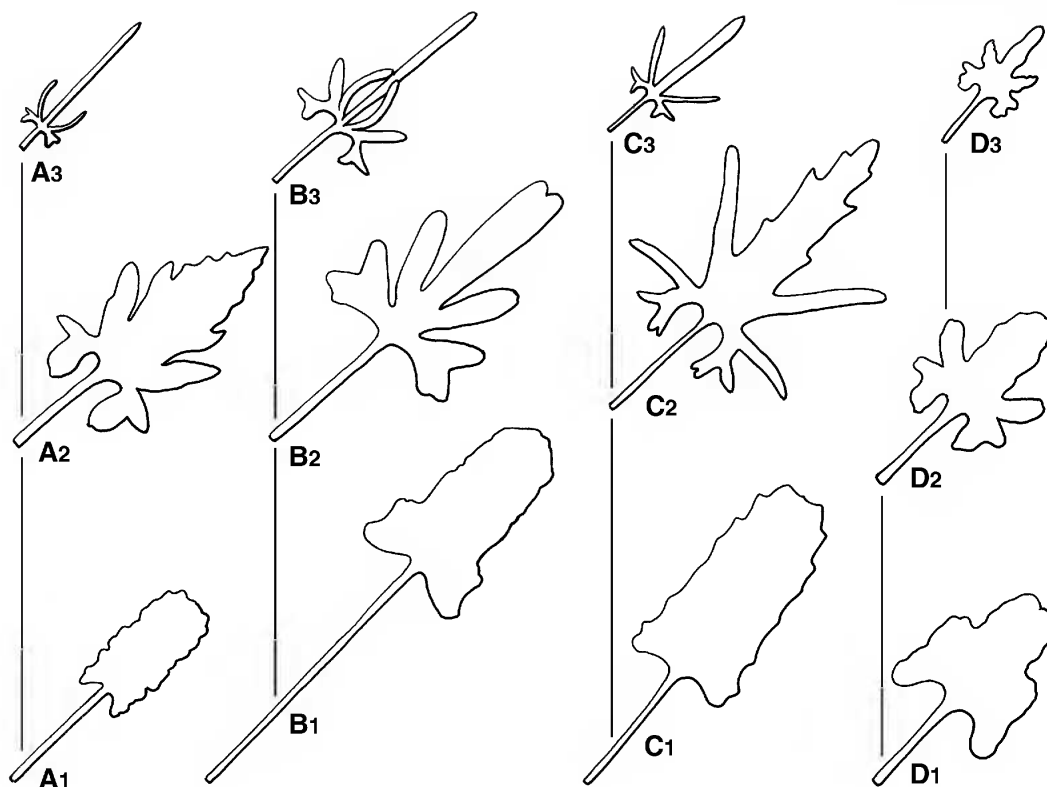


Fig. 9. Variation in leaf shape of *Convolvulus* species from base to tip of stems. A. *C. recurvatus* subsp. *recurvatus*. (1) Copley 823 (AD) $\times 1$, (2) Robards TR2 (NSW) $\times 2$, (3) Copley 823 (AD) $\times 2$; B. *C. recurvatus* subsp. *nullarborensis* $\times 2$. (1) Ising s.n. (AD966061026), (2,3) Wilson 1710 (AD); C. *C. clementii* $\times 1$. (1) Lay 254 (AD), (2,3) Law 3 (BRI); D. *C. tedmoorei*. (1) Moore 5863 (CANB) $\times 1$ (2) Moore 5863 (CANB) $\times 0.5$, (3) McKean s.n. (CANB301718) $\times 1$. Del. W. Smith.

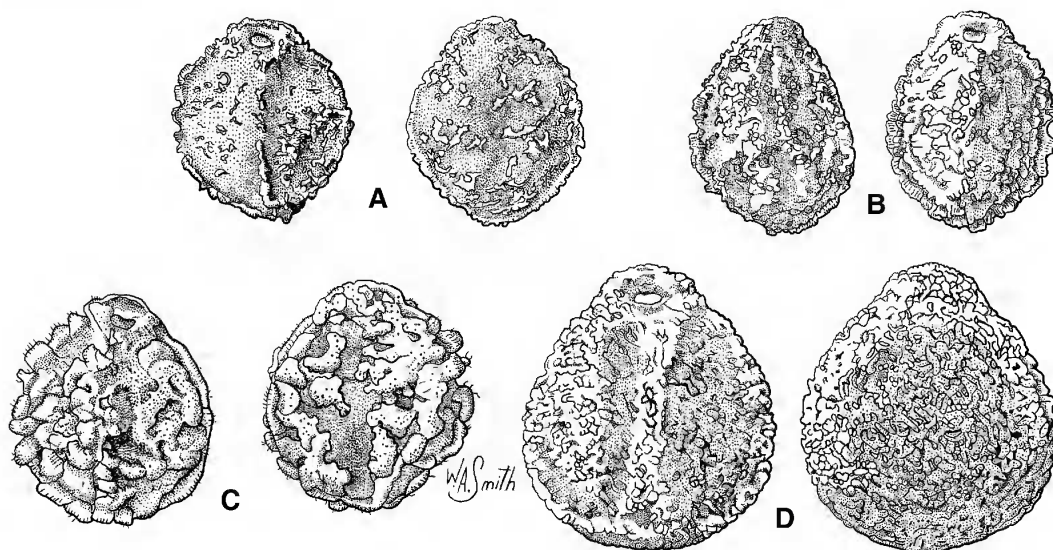


Fig. 10. Seeds of *Convolvulus* species, adaxial (L.H.S.) and abaxial (R.H.S.) surfaces $\times 10$. A *C. recurvatus* subsp. *recurvatus* from Ising 2156 (NSW); B. *C. recurvatus* subsp. *nullarborensis* from George 8482 (PERTH); C. *C. clementii* from George 3938 (PERTH); D. *C. tedmoorei* from McKean 5169 (CANB). Del. W. Smith.

2–5 mm long. Outer sepals obovate, obovate-oblong to broadly elliptic, 3–4 mm long, 2.4–3 mm wide, moderately hairy outside, hairs short appressed to ascending, 0.1–0.4 mm long; inner sepals 3–4 mm long, 2–3 mm wide. Corolla 5–6 mm long, petals 5–7 mm long, 2.5–3 mm wide. Stamens affixed to the corolla tube for 1–1.4 mm from the base, free for 1.2–2.75 mm; anthers 0.5–0.7 mm long, 0.35–0.6 mm wide, basal lobes up to 0.15 mm long. Style 1.5–1.9 mm long; stigmatic lobes, 0.6–1.4 mm long.

Specimens examined: **Western Australia.** 2 miles S of Reid, Nullarbor Plain, Sep 1962, *Aplin* 1671 (PERTH); Nullarbor Plain, c. 115 miles NW of Reid, Oct 1966, *George* 8482 (PERTH). **South Australia.** NULLARBOR REGION: Nullarbor Plain N part, c. 22 km N of Cook, Aug 1980, *Donner* 7216 (AD); Hughes, Sep 1920, *Ising* 1528 (AD, BRI, MEL); c. 1 km NW of Cook, Sep 1960, *Wilson* 1692 (AD, BRI, MEL); 6 km E of Watson, c. 240 km E of WA border on railway line, Sep 1960, *Wilson* 1710 (AD, BRI). FLINDERS RANGES REGION: Leigh Creek on railway to Alice Springs, Oct 1953, *Lothian* s.n.(AD); Leigh Creek, opp. Scout Hut, c. 230 km NNE of Port Augusta, Oct 1969, *Lothian* 5053 (AD). EASTERN REGION: Koonamore Station, c. 60 km N of Yunta, Dec 1926, *Black J.M.Herb* s.n. (AD); Koonamore Vegetation Reserve, c. 400 km NNE of Adelaide, May 1971, *Crisp* 181(AD); Koonamore Vegetation Reserve, 60 km N of Yunta, Mar 1962, *Lange* s.n. (AD); Koonamore, c. 60 km N of Yunta, Nov 1927, *Paltridge* s.n. (AD). EYRE PENINSULA REGION: Gawler Range, 2 km W of Wartaka H/S, Oct 1983, *Weber* 7921(BRI).

Distribution and habitat: *C. recurvatus* subsp. *nullarborensis* occurs in Western Australia and South Australia on the Nullarbor Plain (Map 5) where it grows in chenopod shrublands on clay loam soils derived from limestone. Other populations recorded from central South Australia have been assigned to this subspecies. Three specimens from the Koonamore area appear to belong to this taxon. In particular *Crisp* 181 clearly resembles *Ising* 1528 which was collected from Hughes on the Nullarbor Plain. Two specimens from Leigh Creek (*Lothian* s.n. (AD96212336) and *Lothian* 5053 possess the short recurved fruiting pedicels and short appressed hairs of *C. recurvatus* subsp. *nullarborensis* and though the leaves appear much less divided I have included them under this subspecies. The latter populations grow in arid shrub steppes.

Phenology: Flowering and fruiting have been recorded from late winter to mid spring, from

August to October.

Etymology: The subspecific epithet refers to the Nullarbor Plain from which the most typical specimens of this subspecies have been collected.

11. *Convolvulus clementii* Domin, Biblioth. Bot. 89: 539 (1928) Type: Northwest-Australien: zwischen Ashburton und De Grey River, *E. Clement* (holo: PR).

Convolvulus clementii var. *biflorus* Domin, Biblioth. Bot. 89: 539 (1928). **Type:** Queensland. Sandsteinhugel der Dividing Range bei Jericho, *Domin* III 1910 (holo: PR).

Perennial with trailing and twining stems; stems terete, occasionally with low ribs, moderately densely to sparsely hairy, becoming sparser with age, hairs \pm appressed especially towards the tip of the stem but in lower parts ascending to spreading hairs are common, 0.2–0.8 mm long. Leaves variable in shape and size from base to tip of the stem (Fig. 9C). Basal leaves petiolate; petiole often equal to or longer than the blade, 6–30 mm long; blade oblong to ovate, sometimes triangular, sometimes hastate or auriculate, 7–30 mm long, 5–15 mm wide, apex obtuse to rounded, occasionally emarginate, mucronulate, base truncate to cordate, margins \pm entire to undulate, soon becoming lobed with a prominent pair of basal lobes, a pair of ascending lobes and a terminal lobe, all undulate to irregularly lobed, \pm glabrous but soon becoming moderately hairy, hairs mainly spreading, 0.3–0.5 mm long. Leaves subtending inflorescences petiolate; petiole 2–30 mm long; blade ovate in outline, 10–60 mm long, apex obtuse to rounded, emarginate, mucronulate, base cordate with a broad sinus, deeply lobed, basal pair of lobes linear or narrowly-oblong, 2–15 mm long, with a secondary recurved lobe from the lower margin, often 2–3 toothed, ascending lobes linear to narrowly oblong, occasionally slightly obovate, to 30 mm long, 1–3 mm wide, terminal lobe linear to linear-obovate, up to 55 mm long, 2–10 mm wide, occasionally triangular-oblong and up to 30 mm wide, margin entire, undulate, toothed to shallowly lobed, moderately to sparsely hairy becoming glabrous, usually slightly denser

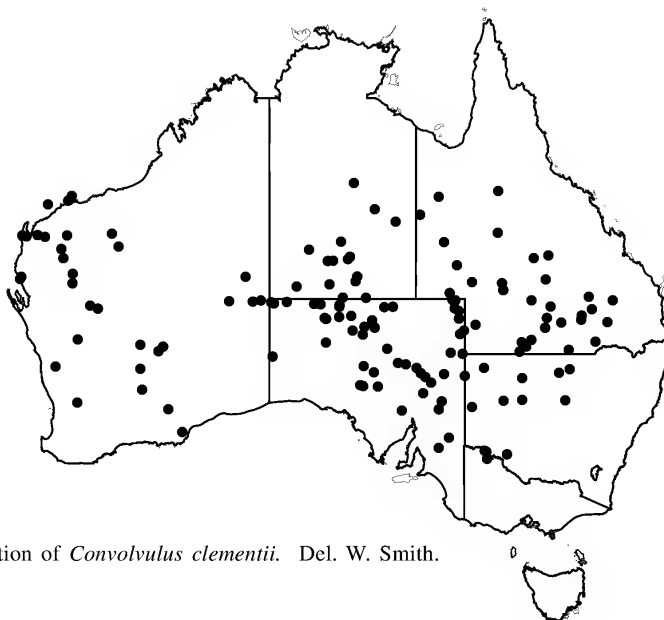
below, hairs crisped-appressed to spreading, 0.2–0.6 mm long. In upper parts, leaves deeply lobed, lobes becoming narrower and aside from the basal lobes, with entire margins. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium with 1 or 2, rarely 3 flowers, or occasionally with 2 inflorescences per axil; peduncle terete, 5–50 mm long, moderately densely to sparsely hairy, hairs crisped appressed, ascending and spreading, 0.2–0.6 mm long; bracteoles opposite to alternate, linear to subulate or rarely narrowly elliptic, 1–4.5 mm long, 0.25–0.5 mm wide, apex acute, ciliate, moderately hairy to \pm glabrous on the back; pedicel 3–15 mm long, rarely longer at fruiting, straight to sinuate or slightly curved at fruiting, hairs often denser and more appressed than for peduncle. Outer sepals obovate, orbicular to broadly elliptic, 4–5.5(–6) mm long, 2.5–4.5 mm wide, apex barely acute to rounded with a recurved apiculum, ciliate, moderately to sparsely, occasionally densely, hairy outside, hairs crisped-appressed, ascending and spreading, 0.2–0.7 mm long; inner sepals orbicular, obovate to obovate-elliptic, 3.5–5.5 mm long, 2.5–4 mm wide, apex obtuse to rounded-truncate with a recurved apiculum, base rounded to truncate, eciliate or with a few hairs on the upper margin, face \pm glabrous with some hairs around the apiculum and midrib. Corolla funnel-shaped, white to pink, rarely purplish, 5–8 mm long, 4–10 mm diameter, flared 2.5–4 mm above the base of the tube; petals 6–9 mm long, 1.5–4 mm wide, with rounded-triangular, broadly emarginate lobes, with a short apiculum, glabrous except for hairs on the outside of the midpetaline band for 1–3 mm from the apex. Stamens 5, slightly unequal; filaments affixed to the corolla tube for 1.5–2.5 mm from the base, free for 1.5–3 mm, with scattered low tubercles, mainly along the margins, from 0.5 mm above the base of the corolla and extending for 1–3 mm; anthers oblong, oblong-elliptic to triangular-ovate, 0.5–0.9 mm long, 0.3–0.5 mm wide, apex obtuse to rounded emarginate, base sagittate, basal lobes 0.1–0.3 mm long. Ovary ovoid to globular ovoid, 1–1.5 mm long, on a disk 0.2–0.25 mm high, glabrous; style 2–3 mm long, with cylindrical to narrowly ovoid, sometimes falcate, obtuse stigmas, 1.3–1.9 mm long, often suffused with purple. Capsule globular to globular-ovoid, 4–7 mm long, 4–6

mm diameter, glabrous. Seeds 4, $\frac{1}{4}$ -globular, 2.5–3.2 mm long, 2–2.7 mm wide, dark brown to black, surface finely punctate bearing irregular short raised ridges and tubercles, made of fused hairs and a serrated to \pm continuous wing of fused hairs to 0.25 mm wide (Fig. 10C).

Selected specimens (170 specimens examined):

Western Australia. Between Menzies and Comet Vale, Sep 1939, *Blackall* 4193 (PERTH); 4.4 miles N of Meekatharra, Oct 1973, *Demarz* 4701 (PERTH); 4 km S of Mt Magnet, Sep 1984, *Demarz* 10196 (PERTH); 1 mile E of Yanrey Homestead, Aug 1960, *George* 1154 (PERTH); Wingkilina, Hinckley Ranges, Jun 1981, *Kalotas* 868 (BRI). **Northern Territory.** Argadargada H/S Bore, Sep 1954, *Chippendale* 308 (DNA); 1 mile S of Elkedra H/S, Oct 1956, *Chippendale* 3097 (DNA); Mt Ebenezar H/S, 57 km W of Stuart Highway on road to Ayers Rock, Sep 1979, *Johnson* 3364 (BRI); 10 miles SSW of Alice Springs, Oct 1956, *Lazarides* 6101 (DNA); Uluru NP - Docker River road, 51 km WNW of Ranger Station, Aug 1988, *Lazarides & Palmer* 542 (BRI). **South Australia.** Far East N of Curnamona Gate & boundary fence, c. 130 km N of Yunta, Nov 1962, *Lothian* 1216 (AD); NW Region Mt Davies, Tomlinson Range, Sep 1955, *SA Pastoral Board* 107 (AD); Lake Eyre Basin NE, Cadelga Waterhole, 10 km S & 60 km E[W] of Queensland border, Aug 1973, *SA Pastoral Board* s.n. (AD); Everard Range at foot of Mt Areteinna, Sep 1968, *Spooner* 136 (AD); Lake Frome NE, c. 10 km W of Quinyambie H/S, Jul 1971, *Whibley* 3535 (AD). **Queensland.** BURKE DISTRICT: 15 km NW of Richmond, May 1974, *Byrnes* 3047 (BRI). GREGORY NORTH DISTRICT: 13 km S of Boulia, Oct 1984, *Neldner* 1631 (BRI). MITCHELL DISTRICT: Winton, Jul 1934, *Blake* 6551 (BRI). LEICHHARDT DISTRICT: Wandoan, Nov 1930, *Hubbard* 5021 (BRI). GREGORY SOUTH DISTRICT: 35 miles ENE of Nappamerry, May 1971, *Silcock* S363 (BRI). WARREGO DISTRICT: 6 km E of Charleville along Morven road, Mar 1976, *Purdie & Boyland* 200/23 (BRI). MARANO DISTRICT: 8 miles E of Weengallen, Nov 1961, *Pedley* 914 (BRI). DARLING DOWNS DISTRICT: c. 12 miles W of Meandarra, Mar 1959, *Johnson* 749 (BRI). **New South Wales.** Donalds Plain, 75 km W of Cobar, Oct 1963, *Constable* 4655 (NSW); Bulloo River, in 1887, *Lockhart Morton* s.n. (MEL); NE edge of Narran Lake, near Brewarrina, Nov 1967, *McGillivray* 2856A (NSW); Paika, Balranald, Mar 1910, *McPherson* s.n. (MEL); 11 km E of Warratta Bore, 32 km E of Milparinka, Oct 1976, *Wilson* 1643 (NSW). **Victoria.** MURRAY MALLEE: Red Cliffs, Nov 1987, *Browne* 474 (LTB, BRI).

Distribution and habitat: *C. clementii* is found south of about 20°S, from around Dampier in Western Australia across the Northern Territory to Richmond in Queensland. It extends southwards to the southern parts of Western Australia and across southern Australia to far north-western areas of Victoria. It is common throughout semi-arid New South Wales and Queensland and is absent within this region in



Map 8. Distribution of *Convolvulus clementii*. Del. W. Smith.

only the most arid areas of the continent (Map 8). It is found mainly on plains, often in flooded and swampy situations, but also on clay pans between sand dunes. It grows mainly in grassy woodlands, commonly with *Eucalyptus populnea*, *E. intertexta* and *Acacia aneura*, where it occurs in red-brown sandy and loamy duplex soils and in sands. It is also found in grassy woodlands with *E. coolabah* and *E. largiflorens* along floodplains where soils are usually brown to grey clays, sandy clays to clay loams. It is occasionally found in *Astrebla* grasslands.

Affinities: It appears most closely related to *C. recurvatus* which can be distinguished from this species by its short pedicels which are strongly recurved at fruiting.

Phenology: Flowering and fruiting have been recorded throughout the year though flowering may be more common in late winter to mid spring (August–October) and fruit are found mainly in the early autumn to late spring (March–November).

Etymology: This species was named in honour of Dr E. Clement, a botanical collector who lived in Western Australia and who sent the type specimen to Dr K. Domin in Prague.

Conservation Status: This species is widespread.

12. *Convolvulus tedmoorei* R.W. Johnson, sp. nov. affinis *C. clementii* Domin sed caulibus et foliis multis grossis et seminibus grandioribus et alis destitutis differt. **Typus:** New South Wales, 5 miles [8 km] NW of Louth, 7 September 1971, C.W.E. Moore 5863 (holo: CANB; iso: BRI, NSW).

Perennial with trailing stems; stems coarse, terete, moderately to sparsely hairy, hairs weakly ascending, 0.25–0.4 mm long. Leaves somewhat similar in shape from base to tip of the stem (Fig. 9D). Basal leaves petiolate; petiole long, often as long as the blade; blade ovate, apex rounded to emarginate, base cordate, shallowly lobed particularly at the base, sparsely hairy, hairs as for the stem. Leaves on fertile stems petiolate; petiole 10–40 mm long; blade broadly ovate, oblong or oblong-triangular, 20–50 mm long, 15–40 mm wide, apex rounded to emarginate, base cordate, decurrent, basal lobes broad, 5–10 mm long, with 2 or 3 rounded emarginate lobes, ascending lobes oblong, 5–12 mm long, 2–8 mm wide, terminal lobe oblong 10–25 mm long, 3–20 mm wide, margin undulate to shallowly lobed, moderately to sparsely hairy, hairs crisped and

loosely appressed to weakly ascending, 0.25–0.4 mm long. In upper parts, leaves similar in shape but shorter and with narrower lobes. Inflorescence solitary, axillary, bracteolate, a one-sided dichasium with 1 or 2 flowers, or commonly with 2 inflorescences in each axil; peduncle terete, 7–30 mm long, moderately hairy, hairs crisped-appressed to weakly ascending, 0.25–0.5 mm long; bracteoles opposite to subopposite, narrowly triangular, 1.5–2.5 mm long, acute, ciliate, moderately to sparsely hairy on the back; pedicel thicker than the peduncle, dilated upwards, 6–13 mm long, more densely hairy than the peduncle. Outer sepals elliptic to obovate, becoming orbicular, 5–6 mm long, 4.5–5.5 mm wide, obtuse to barely acute with a short recurved apiculum, becoming rounded acuminate, mucronate, ciliate particularly in the upper half, sparsely to moderately hairy outside, hairs ascending 0.15–0.3 mm long; inner sepals obovate, 5–6 mm long, 4.8–6 mm wide, apex rounded, shortly apiculate, base truncate, glabrous except for short cilia around the apex. Corolla funnel-shaped, 5-lobed, white to pink?, c. 7 mm long and c. 8 mm diameter, flared c. 4.5 mm above the base of the tube; petals 8–9 mm long, 2.5–3 mm wide, with well developed oblong, rounded, emarginate lobes, glabrous except for dense hairs on the outside of the midpetaline band for c. 1.5 mm from the tip. Stamens 5, unequal; filaments affixed to the corolla tube for c. 2 mm from the base, free for 2–3 mm with low tubercles, mainly along the margins, from almost the base of the corolla tube and extending for c. 2.5 mm; anthers ovate to triangular-ovate, 0.75–0.85 mm long, 0.6–0.65 mm wide, apex rounded-emarginate, base sagittate, basal lobes 0.1–0.2 mm long. Ovary ovoid, 1.25–1.3 mm long on a disk, 0.3 mm high, glabrous; style stout, c. 3.5 mm long, with stout cylindrical stigmas, 1–1.1 mm long. Capsule globular, 6–7 mm long and wide, glabrous, 2-valved. Seeds 4, ¼-globular to ¼-globular-obovoid, 3.5–3.8 mm long, 2.8–3.2 mm wide, very dark brown to black, surface finely punctate bearing numerous laterally compressed and wavy tubercles, with no obvious wing (Fig. 10D).

Specimens examined: New South Wales. Toganmain Station, Darlington Point, Jun 1969, *McKean* 5169 (CANB); 5 miles NW of Louth, Sep 1971, *Moore* 5863 (CANB, BRI, NSW).

Distribution and habitat: *C. tedmoorei* is known from only two areas on the flood plains of the Darling and Murrumbidgee Rivers in central western New South Wales (Map 5). It grows in self-mulching grey clay soils.

Affinities: This species most closely resembles *C. clementii* but it can be distinguished by its more prostrate and fleshy habit, its coarse stems and its larger capsules and seeds. The seed surface structure is also a distinguishing character as can be seen in Fig. 10, as is the lack of a wing on the seed.

Notes: Only one flower of this species was available for dissection so information on its floral attributes is limited.

Etymology: This species is named in honour of C.W.E.(Ted) Moore, a distinguished CSIRO plant ecologist, who brought this taxon to my notice and collected one of the two known collections of it.

Conservation Status: This species is known from only two localities and both collections were made about thirty years ago. It is certainly a rare species and should possibly be accorded a higher conservation status than rare.

Acknowledgements

I am deeply grateful for the assistance provided by Jeny Calway and Hans Dillewaard in growing and collecting data from plants in the BRI glasshouse at Indooroopilly in Brisbane. In particular, I would like to thank Hans for his photographic assistance. The generous help given by John Parham in collecting material from key areas in Tasmania is also appreciated. Many thanks are also due to Will Smith for the illustrations. I would also like to thank the referees for their careful reading of the manuscript and helpful comments.

The curators of AD, HO, MEL, NE, NSW and PERTH are thanked for providing loans of specimens for this study. My special thanks are given to Dr G.P. Guymer, Director of the Queensland Herbarium, for allowing me to use the herbarium and providing space and facilities to enable me to continue my research.

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